Some rail bridges are imposing structures soaring over deep valleys. But most are smaller in stature, separating railroads, highways and rivers.

Regardless of size or purpose, bridges are critical to railroads' operations, and the cost to maintain, upgrade or replace them can reach tens of millions of dollars. In addition to the expense, railroads continue to confront a number of bridge issues, such as age, train speed restrictions, growing highway traffic and environmental matters.

Following are a sampling of freight and passenger railroads that are tackling major bridge projects to not only modernize key structures, but solve operational problems.

A daunting structure that’s long presented Union Pacific Railroad a number of operational challenges is the Kate Shelley Bridge. Union Pacific Railroad is building the Boone High Bridge near Boone, Iowa, to replace the Kate Shelley Bridge, which was built in 1902.
Shelley Bridge, which is 2,685 feet long and rises 190 feet above the Des Moines River. Located near Boone, Iowa, on the Class I’s mainline between Omaha, Neb., and Chicago, the double-track, open-deck bridge was built between 1889 and 1902.

Until the railroad spent $3.5 million to upgrade the bridge in 2002, traffic was limited to one train. Although the bridge now can accommodate two trains, speed is limited to 25 mph.

“Not only is the speed restriction a problem for the 70 trains that cross the bridge daily, the bridge was old and was nearing the end, and needed to be replaced,” says Todd Martindale, UP’s director of bridge construction.

Last year, the Class I began building a replacement structure called the Boone High Bridge. The $43 million project will be completed by year’s end, at which time the structure will be one
of North America’s highest double-track rail bridges, according to UP.

Construction is progressing on the Boone High Bridge, over which the railroad will be able to increase train speeds to 70 mph, says Martindale.

“We have finished the drilled shaft construction, which goes down 40 to 100 feet deep for the support columns that range from seven to 10 feet in diameter,” he says, adding that UP will begin setting steel in July.

The old bridge is named after Kate Shelley, who, as a 15-year-old in 1881, alerted Chicago & Northwestern Railroad officials about a bridge collapse in the same area as the current structure. Due to its historic stature, the Kate Shelley Bridge will not be torn down, says Martindale. Instead, both ends will be blocked to traffic.

IN WITH THE OLD

During construction of the Boone High Bridge, the railroad recycled 23 spans from an abandoned Chicago, Rock Island & Pacific Railroad bridge located 50 miles downstream. The railroad is saving millions of dollars by using the old spans as part of the 50 required for the new structure, says Martindale.

“We dismantled the old bridge about three years ago, storing the spans in the Boone yard until we needed them,” he says.

Next year, UP also plans to reuse spans from an old Missouri Pacific Railroad bridge near Boonville, Mo., for a project near Osage City, Mo. In addition, crews will disassemble a 258-foot-long lift bridge near Houma, La., and transport it by water to Freeport, Texas, to replace an older bridge.

Another Class I plans to eliminate a more-than-century-old Iowa bridge. Next year, BNSF Railway Co. will begin replacing a bridge in Burlington that spans the Mississippi River.

The current 2,000-foot-long bridge with a 362-foot swing span dates to 1868 and was updated from wrought iron to steel in 1891, says Steve Millsap, BNSF assistant vice president-structures.

The bridge has been a replacement candidate for some time, but cost has been a prohibiting factor, he says. When

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— Steve Millsap, BNSF
owners to apportion costs. However, BNSF officials have been waiting for federal funds to become available.

“There is a formula for the amount of compensation and under this [act], we will receive about 89 percent of the cost of the replacement,” says Millsap.

A BIG LIFT
To be completed in 2012, the project calls for replacing the swing span and both approaches, realigning approaches to permit higher train speeds and reusing the original right-of-way alignment.

“We looked at two other alignments, but each had drawbacks, and we found that building on the original alignment was the most cost effective,” says Millsap.

The new structure will provide 365 feet of vertical lift. In addition, crews will increase the bridge’s horizontal clearance by removing a pier for the swing span.

“The lift span will open and close more quickly — an important factor as the bridge opens about 2,600 times a year,” says Millsap.

Meanwhile, the New Orleans Public Belt Railroad (NOPB) is helping to upgrade the Huey P. Long Bridge over the Mississippi River. The bridge currently features two highway lanes on each side of a double-track railroad.

The steel rail bridge is the highest and longest — at a little more than four miles — in the United States, according to NOPB, which owns the Huey P. Long Bridge. The short line maintains the railroad portion and the Louisiana Department of Transportation & Development maintains the roadway.

“The majority of the project involves the highway portion, which is being widened from two narrow lanes to three wider lanes, with the addition of shoulders,” says NOPB Assistant Chief Engineer Robert Kollmar.

The $987 million project began in 2006 and is expected to conclude by mid-2008. The cost of the railroad-related portion is $13 million.

INSIDE JOB
In essence, the railroad’s portion of the project entailed building a bridge inside a bridge, says Kollmar. Crews built new piers under the bridge and the old piers were removed to accommodate roadway approach changes.

“We erected new concrete piers on the east side of the bridge and then lifted four 187-ton, 123-foot-long double girders onto the new concrete piers,” says Kollmar.

The short line is coordinating work to minimize delays for Amtrak and the six Class Is that use the bridge. On average, 28 trains cross the structure daily.

“While most of the work benefits highway users, the new design actually picked up part of the weight that was supported by the rail portion, and this entire project has extended the longevity of the bridge,” says Kollmar.

North Carolina Railroad Co. (NCRR) recently eliminated one of its own heavily used and aging bridges. Owner and manager of a 317-mile rail corridor between Morehead City and Charlotte, the railroad in February built a new one-span bridge over Old Highway 70 in Clayton, N.C., to replace a structure that dates back to the early 1900s.

Several trucks struck the old bridge
in the past because of its low 13-foot, nine-inch vertical clearance. In addition, train speeds over the structure — which is used by 70-plus freight trains and eight Amtrak trains daily — had been restricted to 49 mph.

A COOPERATIVE EFFORT

The span was replaced in one day, on Feb. 6. Structural Steel Products Corp. built the new span in cooperation with HSMM Engineering and Norfolk Southern Railway, which operates freight traffic in the corridor on behalf of NCRR. CSX Transportation, NS and Amtrak synchronized a halt to train traffic, and vehicular traffic was rerouted. Cooperative efforts among the parties helped reduce reroutings to 24 hours instead of a planned 36 hours, says Kat Christian, NCRR’s public affairs director.

The structure’s vertical clearance now stands at 15 feet, six inches, and
freight and passenger trains have increased speed over the new bridge.

New York’s Metropolitan Transportation Authority (MTA) also took age and traffic volumes into account when planning upgrades for the Ocean Parkway and Culver viaducts on MTA New York City Transit’s system. In addition, the authority incorporated an art restoration project into the project scope for the Ocean Parkway Viaduct, which crosses a major boulevard in Brooklyn. “The project is unique in that we will be restoring historic tile artwork scenes that were removed and stored to protect them,” says Peter Torres, MTA’s program manager-line structures.

The project, which began in March, also calls for removing track to enable crews to waterproof the four-track bridge deck. MTA plans to complete the project in July 2010.

HITTING A HIGH NOTE

Meanwhile, the Culver Viaduct crosses the Gowanus Canal, which accommodates barge traffic. At 90 feet in elevation, the viaduct — located in Brooklyn’s Red Hook section — is the highest point on NYCT’s system, says Torres.

Scheduled to start in November, the project calls for rehabilitating the four-track, 4,600-foot-long bridge, including removal of the track for deck waterproofing and encasing the steel truss spans in concrete to extend their life, says John O’Grady, MTA program manager-infrastructure.

The project, which could take 20 months to complete, is scheduled to wrap up in August 2012. MTA plans to reroute certain lines and schedule weekend traffic outages to provide crews longer work windows during construction.

OVER-ARCHING EFFECT

Another East Coast transit authority has major bridge work on tap. The Southeastern Pennsylvania Transportation Authority (SEPTA) plans to replace an old stone and brick two-track arch bridge over the Tookany Creek. The structure was built by the Reading Railroad more than a century ago and is used by three lines, says SEPTA Senior Project Manager Jack Gill.

In November, crews will begin constructing a new 30-foot precast concrete span. About three years ago, the old 15-foot span was filled with debris, causing a washout. Given the volume of trains using the line, the agency decided to replace the bridge, says Gill.

“We had a water flow study performed to ensure that when we replaced the bridge, we would not cause flooding downstream,” he says.

After the new bridge is built over the old one, the existing structure will be removed. The project is scheduled for completion in November 2009.

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