

# Relationships Spur Success for Burgess & Niple

High percentage of repeat clients and strong communication with stakeholders bring engineers many high-profile bridge projects

by Craig A. Shutt

Having celebrated its 100<sup>th</sup> anniversary in 2012, Burgess & Niple (B&N) takes pride in the many projects its bridge division has created through those years. Its website understates “We’re over the hump and long past the uncertainties faced by start-ups.” That long-term success has resulted from strong client relationships and an eagerness to tackle complex projects, especially those that require some aesthetic panache.

“We emphasize our ability to build relationships with clients and local communities, giving them a better experience than they can get from other firms,” says Tom Bolte, bridge group director for the Columbus, Ohio-based company. “We focus on clear communication throughout the project and on working as a partner. We strive to avoid misunderstandings at all costs.”

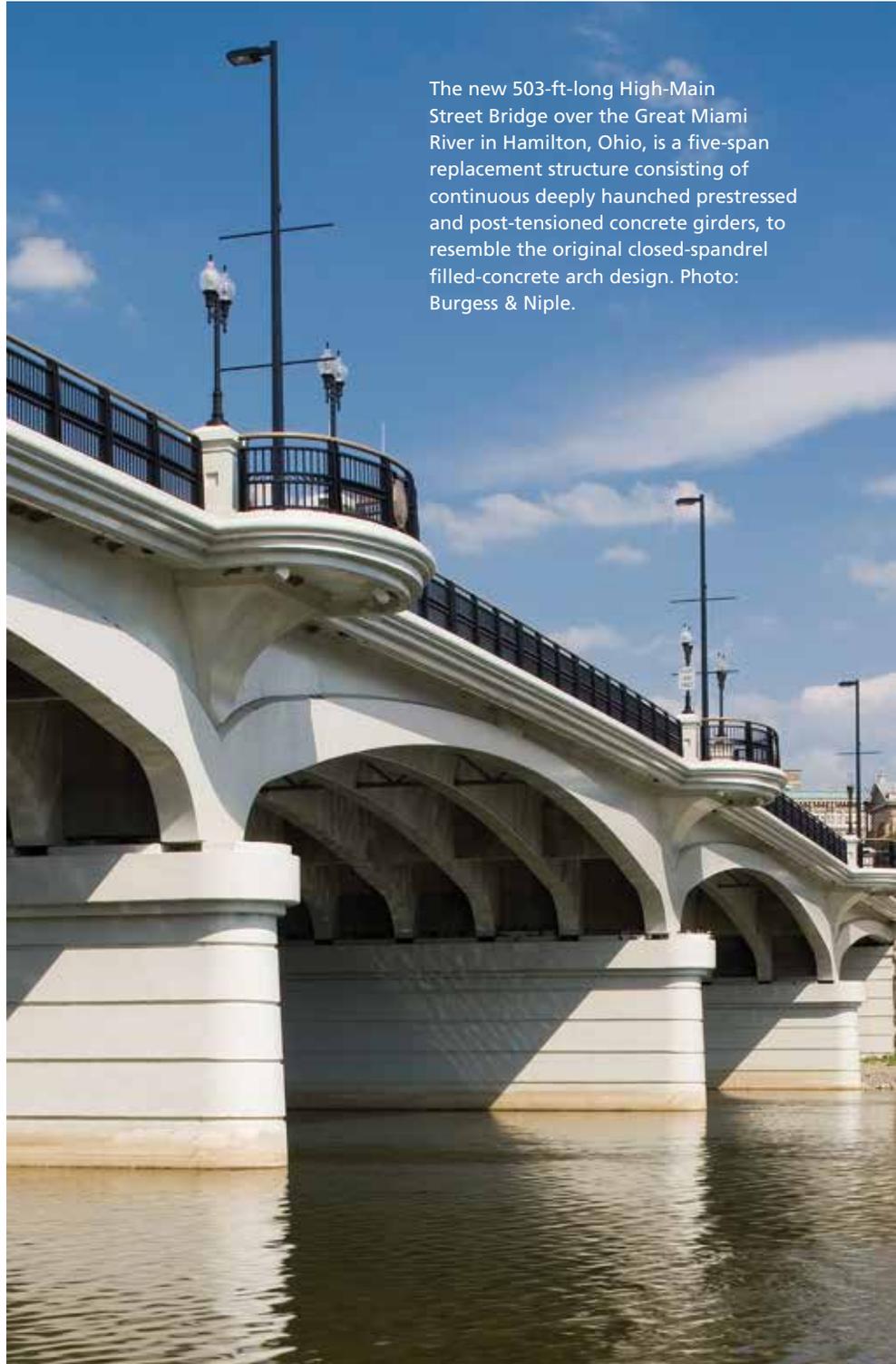
Its success in that regard can be judged by the nearly 80% of its current business derived from repeat clients. “Our experience and resources are a big part of the equation,” he says. “But another key element is the confidence our clients have in us. Our business ethics, standards for quality, and concern for the communities we support are a vital part of who we are and what we offer.”

Much of B&N’s work has focused on complex bridges with difficult challenges, from tight sites to traffic disruptions and multiple connections. The firm also has gained recognition for its many bridge designs where aesthetics are a critical aspect of the project.

### Aesthetic Needs Growing

“We design a lot of bridges that are aesthetically pleasing and become notable,” Bolte says. “We are known for creating signature bridges for communities, even though we don’t have a singular style.” Aesthetics

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The new 503-ft-long High-Main Street Bridge over the Great Miami River in Hamilton, Ohio, is a five-span replacement structure consisting of continuous deeply haunched prestressed and post-tensioned concrete girders, to resemble the original closed-spandrel filled-concrete arch design. Photo: Burgess & Niple.

are becoming more significant for many owners, he notes. "Aesthetics are definitely an element in even our freeway bridges today," he says, noting that many departments of transportation (DOTs) have developed aesthetics manuals to ensure a design style is followed and to encourage creativity.

"Bridges often are at the center of a community," explains John Shanks, director of bridge and structure design in the Columbus office of B&N. "Sometimes, we replace historic bridges or distinctive designs that are functionally obsolete or deteriorated beyond repair and that the community doesn't want to lose."

A good example is the High-Main Street Bridge over the Great Miami River in Hamilton, Ohio. The five-span bridge features 95-ft-long precast concrete girders with deep haunches spliced together to create a historic look. Aesthetic details include balcony overlooks at piers, decorative concrete forming, ornamental crash-resistant vehicular/bicycle railing, landscaped pedestrian plazas, sidewalk brick patterning, terraced bank grading, memorial plaques, and architectural lighting.

"Spliced girders can provide designers with greater flexibility to customize the

shape of the girders to meet a wider variety of aesthetic needs," Shanks says. In this case, the bridge was eligible for placement on the National Register of Historic Places and was located in the Hamilton Civic Center Historic District.

On a smaller scale, aesthetics also were a key part of the Emerald Parkway Bridge over North Fork Indian Run in Dublin, Ohio. The project comprised 4000 ft of new, separated four-lane parkway; 3000 ft of roadway widening; and twin, 95-ft-long, single-span concrete box beam bridges. The bridges included decorative arch fascia panels, ashlar limestone facing on the abutments, and aesthetic concrete railings.

The use of fascia panels is gaining popularity, Bolte notes. "Some engineers are purists and don't want to use a façade, even if it's functional. But it's impractical today to be so rigid. We don't want an obvious façade—we're sensitive to that concern—but we do want to provide an aesthetic appearance that is pleasing, distinct, and in harmony with its natural and/or civic setting."

B&N used the concept of a functional fascia treatment on the Fifth Street Bridge over the Great Miami River in Dayton, Ohio. Designers specified constant depth, prestressed concrete,



The Fifth Street Bridge in Dayton, Ohio, used haunched exterior girders to invoke the appearance of the original closed spandrel arch bridge. Photo: Henry G. Russell Inc.

interior girders and haunched, precast post-tensioned, exterior girders to invoke the appearance of the original seven-span, 620-ft-long, closed-spandrel arch bridge.

"There was no underside view to the bridge, which allowed us to achieve a dramatic look and keep it economical," Bolte explains. "Using a combination of girders provided a good blend of economy and aesthetics. As these ideas begin to gain notice, I expect we'll see more façade treatments of all types being used." He also expects to see more use of color additives to heighten aesthetics. "We see additives being used on buildings, but not very often for bridges."

### Concrete Advantages

The desire for such aesthetic treatments often leads the firm, and their clients, to using concrete, even to replace existing steel bridges. "When owners want something unique to make the community stand out, it's often easier to achieve that with concrete," says Bolte. "Concrete aesthetics turn out very well due to the ornamental designs we can achieve with railings, posts, and beam designs."

Today, B&N designs about half of its bridges using concrete, with this number continually increasing. "It's hard not to notice the increased interest, especially in states such as Ohio," says Bolte. Ohio is moving toward concrete bridges partly due to ODOT's receptiveness of value-engineering, he notes. "Contractors come into



The Emerald Parkway over North Fork Indian Run in Dublin, Ohio, consists of twin, 95-ft-long single-span, concrete box-beam bridges. Detailing included decorative precast concrete arch fascia panels, ashlar limestone facing on abutments, and aesthetic concrete railings. Photo: Burgess & Niple.

design-bid-build situations and suggest alternatives more often today, and often those involve changing steel bridges to concrete."

As designers, Shanks notes, "We consider all ideas when deciding on the best design approach. But often, economics make concrete designs preferable." Those economics frequently are driven by the speed with which concrete can be used to construct the bridge, he notes, especially with possible delivery delays for steel superstructures.

Owners also are taking a closer look at incorporating concrete designs because of decreased life-cycle costs, he says. "There is a stronger demand among owners for concrete bridges than in the past due to their decreased maintenance issues. With the advent of high-performance, low permeability concrete, the durability of concrete has been enhanced. Also, options and methods for performing maintenance repairs on concrete have improved, allowing concrete to hold its own against steel in that regard."

## Concrete durability has appeal for owners.

Concrete's durability has appeal for owners. "States that use a lot of deicing chemicals need high durability, and they're well aware of the options in concrete that can create durability," Shanks adds.

### Speed Matters

Most clients also are looking to build faster to reduce user costs for disruptions. "Clients are embracing the Federal Highway Administration's 'Every Day Counts' program, and we're seeing this trend at industry-related conferences," says Shanks. "We're looking at new approaches for using precast concrete elements, which can be prefabricated and then assembled on site, to speed construction."

An example of those approaches can be seen in the Rich Street Bridge over the Scioto River in Columbus. B&N led a team that designed a five-span, three-



The 568-ft-long Rich Street Bridge in Columbus, Ohio, features precast, post-tensioned lightweight concrete rib arches, with reinforced concrete piers and abutments. Photo: Burgess & Niple.

lane, precast concrete, post-tensioned, rib-arch bridge, using lightweight, low-permeability concrete. The context-sensitive design blends with existing bridges on the river corridor to create a "family" of arch-style bridges.

B&N created a three-dimensional structural model of the design using structural analysis software. The model included multiple stages of construction, incorporated the multiphased post-tensioning procedure, and considered the effects of time-dependent behavior of the concrete. This information proved especially valuable when, during the design process, the team was asked to shorten the construction schedule to complete the project in time for the city's bicentennial celebration in 2012.

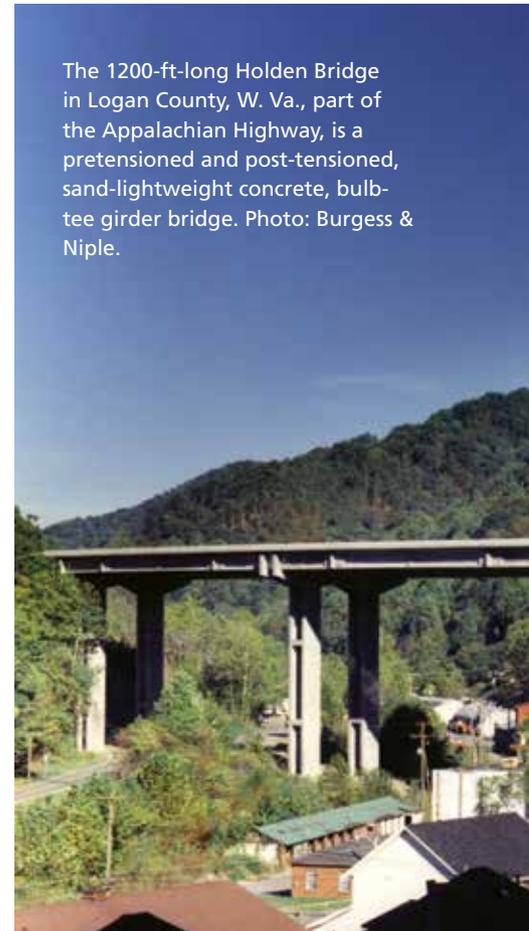
Speed also was a key factor in the design of the Holden Bridge in Logan County, W.Va., for the West Virginia Department of Highways. Part of the final stages of the Appalachian Highway, the 1200-ft-long, precast, pre-tensioned and post-tensioned concrete, bulb-tee spliced-girder bridge was designed as a concrete alternative for the project. It ultimately was selected as the most cost-effective design.

In part, the design was chosen for the speed achieved with techniques such as providing 220-ft-long spans by suspending 114-ft-long, girders between the pier girders, splicing them together, and post-tensioning them to create a 1233-ft-long continuous structure on a curved alignment. Contractors also used jump forms and post-tensioned bracing to speed

construction and eliminate the need for scaffolding. High-strength, sand-lightweight concrete allowed span lengths to be maximized while achieving a minimum weight.

"Lightweight concrete helps with components that need to be transported to difficult sites, and additionally, where crane replacement locations are constrained," says Bolte. "It can allow us to solve challenges by creating longer spans than we could provide otherwise."

The 1200-ft-long Holden Bridge in Logan County, W. Va., part of the Appalachian Highway, is a pretensioned and post-tensioned, sand-lightweight concrete, bulb-tee girder bridge. Photo: Burgess & Niple.



## Extending Bridge Life

B&N is finding that one way to decrease time lost to closures is to keep the existing bridge open as long as possible during construction, which is a typical practice when rehabilitating existing structures. Owners too, are looking for new techniques to extend bridges' service lives rather than start new, both for time and budget savings.

Preparing bridge rehabilitation construction plans that effectively extend the service life of the bridge requires in-depth knowledge of how various bridge materials and details perform. Within its inspection division, B&N has a full-time staff of 20 bridge inspectors (all bridge engineers) and integrates bridge designers into its bridge inspection teams, providing more insight into how bridges have been built in the past, what worked well, and what didn't.

"We've pioneered a number of inspection-access techniques that allow us to inspect bridges more accurately and efficiently to determine if it's sensible to save them," says Bolte. "With the volume of traffic on bridges today that wasn't anticipated when they were built, and the requirement to keep

bridges in service as long as possible, we look at saving the structure whenever possible. But there are challenges with older structures, so repairing or replacing isn't always an easy choice."

## The Future

The growing requirements from owners and the increased input from community leaders have led to more communication among stakeholders and more ways to gather input from local groups. "There's certainly more public involvement in the design process today, and people expect to be asked for their feedback today," Bolte says. "Stakeholders have different ways they like to communicate about a project. Each client wants to handle that input in different ways, based on their own needs, and we adapt to their requirements on a case-by-case basis."

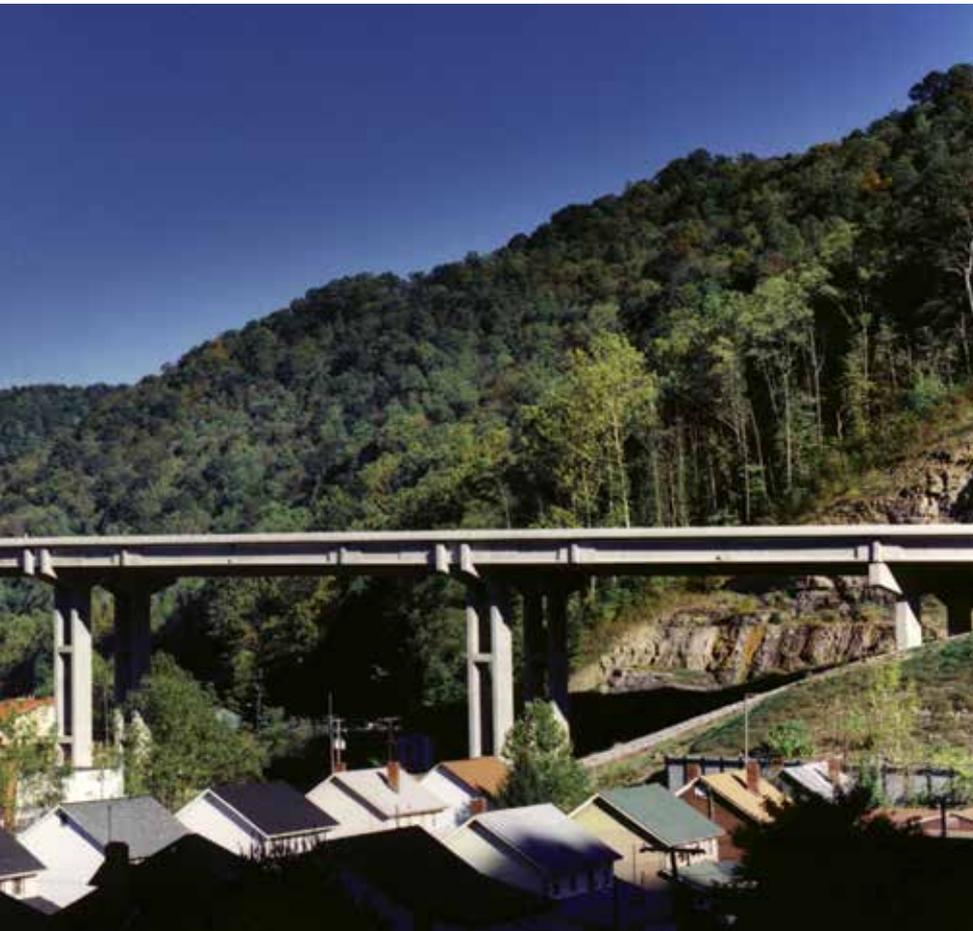
Also evolving are project delivery methods, with more emphasis on design-build delivery. "That's definitely increasing, due to the speed that can be achieved, as well as the economics and innovation," Bolte says. "It affects with whom we need to have relationships with for our own success. We've typically worked with DOTs as our clients, but more often today, it's the

## 100 Years of Design Excellence

Burgess & Niple (B&N) was established in 1912 in Columbus, Ohio, by Philip Burgess and Chester Niple to provide modern waste-treatment practices to Ohio. It added transportation design work in the 1950s. Today, the firm provides civil engineering services of all types to government, military, educational, and private enterprises. That work includes architecture, environmental services, land development, and utility infrastructure in addition to transportation services.

Although it operates 19 offices nationally, bridge design work is focused in seven offices around the country. The firm has performed design plan review for more than 3000 bridges for departments of transportation in Ohio and Indiana and is ranked 138th out of 500 design firms by *ENR*. It also ranked 19th on the 2012 list of "Go-To Firms" by *Roads & Bridges* magazine.

For more detail on B&N projects, see the Fall 2007 (High-Main Street Bridge) and the Fall 2012 (Rich Street Bridge) issues of *ASPIRE*.



contractor who is putting together the team. That means we have to ramp up our efforts in those areas."

Creating partnerships with new clients will play well to the firm's commitment for clear communication and working closely with clients in a mutually beneficial way. "We need to continue getting to know the contractors better and collaborating with them to mitigate risk as the project proceeds," he says. "Our intent is to seek out design-build work in realms where we're already working. But I believe the quality of work we do and our communication with clients, especially in areas such as documentation and avoiding change orders, make it easy for us to adapt." 

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