

## **Overarching Achievement**

### ***New Bridge Crowns Ohio's Cap City***

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As the City of Columbus, Ohio ushered in its bicentennial in 2012, the landmark Rich Street Bridge crowned downtown when it opened that same year. This iconic structure completes the transformation of Columbus' riverfront area, which has been under development for more than three decades.

### **Community Connection**

The 563-foot modern rib arch structure was designed by Burgess & Niple (B&N). Built on a new alignment to replace the deteriorating Town Street Bridge, the Rich Street Bridge improves connectivity downtown and will help bolster economic development.

The new span complements the City's historic district while blending with the family of arch bridges along the Scioto River. The Rich Street Bridge features:

- A modern precast open rib arch design
- Five spans and three lanes
- A slender, open design that provides more transparent views and reduces flooding impacts
- Architectural lighting above and below the bridge deck
- Pedestrian friendly amenities, such as wide sidewalks and plazas
- Utilities integrated in the bridge railing and sidewalk for use during festivals and community events

### **Smart, Strong and Stunning**

The distinctive Rich Street Bridge design required complex engineering. B&N engineers made refinements during the design process that shortened construction by seven months and reduced estimated project costs by \$10 million. Design innovation and benefits include:

- **Time and cost savings** – The varied sizes of bridge arches were designed to be fabricated from one common adjustable form, which saved both time and money. Bridge apex and drop-in segments also were fabricated using multi-use adjustable forms.

Using lightweight precast concrete arch ribs instead of cast-in-place folded plate arches (as originally planned) decreased the construction time.

Costs were further reduced by eliminating the need to construct temporary formwork in the river channel during bridge construction and trimming the width of the bridge deck.

- **Maintenance-friendly** – With the pre-stressed, post-tensioned, fully continuous five-span frame design, there aren't any intermediate joints in the bridge, which helps prevent corrosion.

The use of precast elements resulted in a more durable structure, which reduces maintenance costs. Elements precast in a controlled environment have improved concrete quality, with higher strength, and superior architectural appearance.

- **Reduced flooding impacts** – The rib arches have a slender and open design that improves river flow during flooding events and reduces flooding impacts.
- **Deadline-driven** – The bridge location was realigned and landed within park boundaries after initial environmental documentation was approved. B&N quickly addressed numerous environmental impacts and collaborated with federal, state and local agencies. Environmental documentation and bridge design were developed simultaneously to meet project deadlines.

### **An Evolution in Concrete Bridge Design**

The Rich Street Bridge advances the evolution of concrete bridge design. The use of lightweight precast beam, arch rib, and arch apex segments stitched together with a combination of pre-stressing and field post-tensioning created the fully continuous frame, eliminating intermediate expansion joints and spandrel columns.

### **A Downtown Destination**

The landmark Rich Street Bridge opened to more than 400,000 pedestrians strolling the Columbus Arts Festival in June 2012 and eyeing the sky for fireworks during the City's July 4th Red, White & Boom celebration.

During his comments at the bridge opening ceremony, Columbus Mayor Michael B. Coleman called the Rich Street Bridge a history-making structure that is connected to the economic development of the community.

"It's a beautiful bridge," noted Mayor Coleman. "And our goal is to make the city better in every way... this bridge will certainly be a part of making our city the best city in the nation to live, to work and to raise a family."

B&N provided bridge engineering and design, lighting design, roadway and utility design, environmental services and on-call construction services. Project partners included Leonhardt, Andrä und Partner (structural engineering), Bridgescape LLC (architectural design), Prime Engineering and Architecture (substructure design), and Kinzelman Kline Gossman (landscape design).