



INNOVATIVE AND EFFICIENT CYCLING AMIDST OBSTACLES

Philadelphia, Pennsylvania

EXPANDING ACCESS TO THE BICENTENNIAL BRIDGE

When the Betsy Ross Bridge was built in 1976, it was known as "the bridge to nowhere," lacking infrastructure on either end of the bridge and key connections to major highways. As infrastructure developed and transportation demands increased, replacing and adding ramps to access the Betsy Ross bridge was desperately needed to improve the traffic flow efficiency in a largely congested area. Planning and sequencing the reconstruction of the bridge ramps was critical to the project's success. With strict attention to detail, the EFCO engineering team has been the formwork expert for bridge ramps for decades.

BETSY ROSS BRIDGE RAMP CONSTRUCTION

Currently, work along the I-95 corridor continues to be a focus of the Pennsylvania Department of Transportation (PADOT). The highway has been broken into various projects, with I-95 between Bridge Street and the Betsy Ross Bridge being designated as the BR2 section. BR2 was awarded to **Buckley & Company** and includes ramp improvements at the I-95/Betsy Ross Interchange.

- Replace the ramp from northbound I-95 over Frankford Creek and connect to the Betsy Ross Bridge
- Replace the ramp from Betsy Ross Bridge to southbound I-95
- Replace the ramp from the Betsy Ross Bridge to northbound I-95
- Replace the ramp from Aramingo Avenue to southbound I-95

With a completion date of 2023, this \$93M project will minimize disruption to traffic by constructing each ramp separately. ►

Custom blister formwork was connected to PLATE GIRDER forms to create the hammerhead pier caps.



Round Column formwork measuring 7' and 8' in diameter was used to form the pier columns, with the tallest being 58'-6" in height.





The pier cap formwork and rebar, were built around the column formwork on the ground.

FORMWORK FOR BRIDGE RAMP ABUTMENTS AND WING WALLS

Buckley & Company has been a long-time EFCO user, purchasing **PLATE GIRDER**® formwork since the 1990s. They chose EFCO again for the BR2 project. They utilized their formwork inventory for the bridge abutments and wing walls and leased the remainder of the formwork from EFCO for the pier caps.

PIER COLUMN FORMWORK

Round Column® formwork measuring 7' and 8' in diameter was used to form the pier columns, with the tallest being 58'-6" in height. EFCO all-steel Round Column forms are available for purchase or lease. The forming system produces beautiful concrete columns, pillars, and bridge piers. Forms are designed for long life, dependable service, and the lowest total in-place concrete costs.

HAMMERHEAD BRIDGE CAPS USING PLATE GIRDER FORMWORK

Custom blister formwork was connected to **PLATE GIRDER** forms to create the hammerhead pier caps. The cap sizes ranged from 40' to 44' long, with a typical width of 6' and a maximum height of 11'-5". Because of the typical width, Buckley & Company was able cycle the caps with minimal rework.

UNIQUE FORMWORK CYCLING

The formwork was designed to accommodate the varying soffit slopes and utilized hinged formwork soffits to speed up cycling. Challenges due to existing overhead roadways and wires also required unique formwork cycling. Immediately after the pier column formwork was placed, the pier cap formwork and rebar, were built around the column formwork on the ground. After the column was poured and stripped, the cap formwork was ready to be lifted using two cranes simultaneously and set in place, safely clearing all obstacles.



EFCO EQUIPMENT

PLATE GIRDER, Round Column

BUCKLEY & COMPANY TEAM

- William Buckley Project Manager
- Chris Strekis Carpenter Foreman
- Jazz Katz Carpenter Foreman

EFCO FORMWORK SPECIALISTS-MARLBORO

- Pat Beam Territory Manager
- Dan Astarita Field Supervisor
- Jacquelyn Ewald Engineer

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