

# **FOSTERS BRIDGE**

## **ODOT 827(90)**

**Contractor: Beaty Construction, Inc.**

The Fosters Bridge viaduct was built in 1930 and was located over the Little Miami River near Cincinnati Ohio. The structure is 1,360 feet long and consists of six twin Open Spandrel Arch spans and nine concrete girder approach spans. The bridge rises eighty (80) feet above the river valley and has two county roads, a non-motorized nature trail, and a portion of a private residence's home beneath it.

The five million dollar reconstruction project was broken down into six (6) major sequences:

**Phase One: Removal of the existing barrier railing and sidewalk overhang.**

**Phase Two: Installation of a false deck for work access and debris containment.**

**Phase Three: Removal of concrete girders, deck, and floorbeams on approach spans.**

**Phase Four: Removal of the concrete deck and floorbeams on arch spans.**

**Phase Five: Install poured in place or precast floorbeams, precast box and spandrel beams.**

**Phase Six: Pour concrete deck and decorative concrete railing.**

The Contract was awarded to Beaty Construction in September 1990 and had a completion date of October 31, 1991 with a five thousand dollar per calendar day liquidated damages clause.

Various problems and restrictions pertaining to this project include the following:

- 1. Completion of the project in the allotted thirteen (13) months.**
- 2. Containment of all debris from falling to the ground.**
- 3. Maintenance of traffic on the two (2) county roads with no road closures permitted.**
- 4. Maintenance of safe access for canoe traffic and pedestrians on the nature trail.**
- 5. Performance of the demolition and reconstruction from the existing structure as no right-of-way was secured for land access.**

At a pre-bid meeting ODOT informed prospective bidders that they would be given additional leeway to propose "soundly engineered alternatives" to the plans to help meet the short time constraints and help sell the job. The project was not awarded the first time it was let as all bids were above the engineer's estimate.

Beaty Construction immediately applied for and began negotiations for all the permits and agreements that were required to obtain land access. Eventually an Army Corps of Engineers permit

for river access was obtained and permission was granted from ODNR, Ohio Department of Transportation and Warren County Engineers for "limited access" to the river banks. Finally an agreement was reached with the property owners. Land access was desired to drastically speed up removal and reconstruction as several locations could be worked at once.

Beaty Construction along with Butler Fairman & Seufert, Incorporated submitted a redesign of the transverse floorbeams. Original plans called for a poured in place beam that had the first half of the beam poured and cured. Then a precast spandrel beam was set on the first pour before the second half was poured. Beaty proposed a precast floorbeam which eliminated the form, pour, and cure cycles that would have taken up valuable time to complete all sixty-nine (69) floorbeams. The precast beams were connected to the existing columns with a patented "NMB Splice System." This required grouting dowels into the columns, casting the NMB splice sleeve in the bottom of the precast floorbeams, and pressure grouting the splice to produce a mechanical connection twice as strong as the dowel bars. Not only did the design modification save time, the Ohio Department of Transportation realized a \$93,000 savings to the contract.

Debris containment was handled in two ways. First a containment device was designed by Beaty that could be suspended by a crane and positioned under the overhang to catch any debris that fell during the removal of the overhang. Next, Beaty designed and built a falsedeck below the existing structure. This was used for safe working access during demolition and reconstruction and also served to contain all debris during the deck and floorbeam removals. Beaty Construction devised a method to hold the concrete girder's on the approach spans while they were sawcut loose. Then a crane lifted out out the "T" section of the girder and deck where they were hauled offsite and eventually recycled by another contractor into aggregate. Beaty Construction retained the services of Dr. Robert Lee of the

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**Purdue University School of Civil Engineering to analyze the stresses imposed on the concrete arch rings during the reconstruction. Procedures were developed for the systematic symmetrical loading and unloading of the arches. Concrete counterbalances had to be placed at critical locations on the arch rings during removal operations until the precast floorbeams were placed. Box beams were installed symmetrical on the arches to eliminate uneven loading. Throughout the life of the contract Beaty Construction and the Ohio Department of Transportation had to work closely together to submit, review, analyze and approve the multitude of submittals required.**

**Beaty Construction, Incorporated is very proud of its accomplishments on this project. Ingenuity in various demolition procedures, redesign of construction methods, cooperation of the many governmental agencies involved, and a determination to meet the required completion date all played a part in its success. The major goals were to build a top quality project, on schedule, and under budget with no major injuries were met. Over 45,000 man hours were spent on the project and the only lost time accident was a pinched finger. The structure was opened to traffic three weeks ahead of schedule.**

**The primary people involved in this project were:**

**Leon Beaty P.E, President, Beaty Construction, Inc.**

**Max Meiser, Vice President/Project Manager, Beaty Construction, Inc.**

**Charlie Gannon, Project Superintendent, Beaty Construction, Inc.**

**Bruce Fenimore, Project Engineer, Beaty Construction, Inc.**

**John McConvery, Project Engineer, Ohio Department of Transportation**

**Bill Hyre, District 8 Construction Engineer, Ohio Dept. of Transportation**

**Dr. Robert Lee, Consultant, Purdue University**

**Steve Weintrout, Redesign, Butler Fairman Seufert, Inc.**

**Marty Burke, ODOT Consultant, Burgess & Niple Limited**

**.....and all the dedicated employees of Beaty Construction, Incorporated who literally hung themselves in the balance, doing the real work.**