

## **BRIDGE BUILDING PROCESS – TIME AND SAFETY IMPROVEMENTS**

Tuscarawas County, Ohio

Contact:

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### **Problem Statement:**

For many years we have constructed bridges completely with county forces, including pre-casting our own concrete beams for bridges up to 31' in length, building new abutments for longer concrete beams that were purchased, and bidding them furnished and set. The issues we wanted to address were the reduction of road closing/construction time from six weeks and the improvement of safety conditions by reducing the time working below grade building forms and tying steel.

### **Discussion of Solution:**

Starting with engineering-standard abutment wall cage design, we were able to order our rebar for each abutment so that it was bent and shipped in kit form. We designed cage-tying jigs and had them fabricated by an outside vendor. We also purchased a lifting beam to load and set cages and forms. This allowed us to pre-assemble abutment wall cages in the off season along with our precast bridge beams. This also saved significant time and exposure spent below grade tying steel and setting form panels individually. Form panels were shop-assembled and lowered into place along with the pre-fabricated wall cages. Numerous other labor-saving and safety-related equipment and items were purchased and are outlined under costs.

### **Labor, Equipment, & Materials Used:**

- \_Cage-tying jigs fabricated externally
- \_A purchased rebar-tying gun to reduce time
- \_A purchased, pre-engineered lifting beam to handle cages and form panels
- \_Bridges, jigs, and wall braces engineered in-house
- \_Racks for form trailer fabricated in-house
- \_Form supply cabinet fabricated in-house

**Cost:**

- \_ Fabrication of cage-tying jig: \$1800.00
- \_ Lifting beam – pre-engineered manufactured unit: \$15,500.00
- \_ Rebar tie gun: \$2200.00
- \_ Form trailer – 6 ton: \$4600.00
- \_ Form supply cabinet: \$500.00
- \_ Steel form braces: \$1900.00
- \_ Used stretch trailer (for transportation of cages and forms): \$8500.00
- \_ Form walk planks: \$1520.00

**Savings & Benefits:**

- \_ Reduced inconvenience to the traveling public as road closures were reduced from six to four weeks
- \_ Reduced labor costs by utilizing a three-person crew and spending fewer hours on site
- \_ Created additional off-season work for bridge crew
- \_ Allowed for efficient and productive work for county forces, saved profit costs of using outside contractors, and saved taxpayer dollars
- \_ Improved safety by reducing work below grade by 90%
- \_ With time saved, we are now able to build additional bridges during the construction season (an average of eight per year)

