2014 Concrete Bridge Beam Launcher: Ohio

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PROBLEM STATEMENT:

Our agency replaces up to eight bridges per year using precast bridge beams that are made by our workforce in our beam shop. Our fabricated pre-cast beam sizes range from 10 to 40 feet. Typically each bridge, depending on the span, would require at least 8 beams. The average beam sizes are 20 to 30 feet in length and 18 to 24 inches thick. Each beam, depending on length, can weigh up to approximately 20,000 pounds. Because of the intense schedule of bridge replacements and rising costs each year, we were looking for ways to save money. We evaluated the costs associated with beam replacement requiring the use of a private crane. There also were challenges at times for the subcontracted crane service to meet our tight schedules of the bridge crew during the busy construction season.

SOLUTION:

Build a beam launch devise. Basically it is a heavy duty rail track system with an attached cart that rolls back and forth. During the staging process, the beam launcher is hoisted across the span of the bridge abutments. The cart, simply made of a truck fifth wheel on heavy duty casters, is permanently attached to the rail. The beam launch requires the use of a rubber tired loader, a rubber tired excavator, and a track excavator. All these pieces of equipment are already used at the job site for the bridge construction. The semi-truck, with the loaded beam, backs up to the bridge. The loader attaches to one end of the beam, while the excavator attaches to the other end of the beam. The beam is then hoisted onto the beam launch. One end of the beam fits onto the launch cart, while the other beam is still secured to the loader. The loader attached to the rear of the beam then slowly moves forward. The forward end of the beam that is attached to the cart, then slowly wheels across the track to the other side of the bridge span. Two excavators, one located at each abutment wall, will then lift the beam off the cart equally.

The beam is then set into place. It takes approximately four hours to set eight beams using the same amount of labor that it would have taken using a crane.

LABOR/MATERIALS/COST:

The total cost of material that included the two steel I-beams and steel members that were used to build the beam launcher was only $1,100. Additional costs of $2,400 included miscellaneous hardware, welding and torch use, and county workforce labor. The total investment of this device came to $3,500 which is slightly over the crane service cost of JUST one bridge replacement project.

SAVINGS/BENEFITS TO THE COMMUNITY:

Crane costs from a sub-contractor average $2,500 per bridge. The beam launcher will account for approximately $25,000 per year savings. Another benefit is that the bridge crews have more flexibility with project scheduling in setting the bridge beams. Purchasing a crane is not a feasible option because of the expensive initial purchase, the additional maintenance costs, and having an experienced crane operator. This monetary savings can be applied to other much needed maintenance/replacement projects. Most importantly, this agency is proud of the hard work and team involvement with the bridge supervisor, fabricator, and all who were involved with this successful, cost savings solution.