

ERECTION PROCEDURE TO PASS HIGHWAY GIRDERS OVER A CANAL TO A SECOND CRANE

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ABSTRACT

ADOT required an overpass bridge at the existing Central Arizona Canal to extend the State Route 51 freeway to the 101 outer-loop freeway. The design team chose precast/prestressed AASHTO type VI modified girders to facilitate a fast construction schedule and eliminate the need for shoring over the existing canal and adjacent low-flow drainage area.

The location over the CAP canal and flood drainage area created difficult truck and crane access to erect the multi-span bridge. The 112-foot center span, over the canal, was too long to erect with one crane from one side of the canal. To accomplish the erection, a crane was located on both sides of the canal. The delivery trucks had to be staged perpendicular to the bridge span in the adjacent span area, instead of the desirable parallel position in the same span.

The formulated erection procedure passed one end of the girder from the north crane to the south crane, in mid-air over the canal. This procedure required close coordination of the both cranes operators in conjunction with a coordinated effort from the drivers of the delivery trucks. Erection personnel used a man-lift to gain access to hook and unhook the multiple lifting loops at the leading edge of the girder.

This creative erection solution allowed the erection of the girders within the cost controls and safety standards set forth for the project.

Keywords: *Fast construction, Eliminate shoring, Pass girder in mid-air*

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OUTLINE

Design team specified prestress girders as product of choice to eliminate construction shoring over the canal.

This presentation will discuss the procedures used to solve the challenge of delivering and erecting the girders with two cranes

Tractor and trailer are loaded at production yard

■ Girder is loaded on rear steerable dolly

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Final preparation for shipping the girder

Steerable rear dolly is required to overcome the difficult delivery access and to position girder near the crane for unloading

Sequence of initial steps to unload the girder at the jobsite.

Hauling truck is positioned for unloading the rear dolly. Steerable rear dolly is purposely offset away from the canal

Second set of Four of pickups are used to swing the girder from rear dolly toward the canal

Truck backs up, into the clear area between canal and the rear dolly, as crane swings the girder out over the canal

Sequence of 2nd crane on far bank and manlift preparing to transfer end of girder to second crane

Manlift extends over the canal to prepare to attach slings from second crane to first set of Four pickups

Manlift is in position to attach slings from 2nd crane

Sequence to Complete the erection with both cranes

After backing up to the crane, the tractor and low-bed trailer are in position to accommodate reach and load capacity of both cranes.

Near crane has released from the leading end of girder and reconnected to girder at front low-bed trailer

Girder is lifted by both cranes

Erection process is repeated with each girder from the left to right of the span over the canal

One of the final girders is placed on the piers.

End span delivery access allowed girders to be erected with one crane.

Review items required for a successful project:

- 1. Design Team preplanning
 - Truck access & crane capacity
 - Electric line interference, if applicable
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- 2. Producer Bid items
 - Access ramp requirements
 - Available space for crane & delivery truck
 - Electric line clearances, if applicable
- 3. Drafting/Engineering coordination
 - Communication from erection department regarding the need for double set of pickups
 - Identify the end of girder requiring extra pickups
- 4. Production/Q.C. coordination
 - Install and confirm double set of pickups are produce are required.
- 5. Loading crew items
 - Load girders with double set of pickups & mark number orientated on the truck per erection-site requirements
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- 6. Erection crew planning
 - Plan & provide equipment required
 - Organize & instruct the crew on proper sequence and procedures to install the girders.

CONCLUSION

- This creative erection solution:
- Enabled erection of the bridge without shoring
- Facilitated a fast construction schedule
- Was performed within safety standards
- Was completed within the cost of budget

■ Questions and Answers