TIME IS MONEY: INNOVATIVE CONTRACTING METHODS IN HIGHWAY CONSTRUCTION[a]

Discussion by L. Kent Brown,[4] P.E., Member, ASCE

First, let me say that I found the subject article in the September 1995 *Journal of Construction Engineering and Management* to be one of the best that I have seen in this specific journal; Professors Herbsman and Chen and Mr. Epstein are to be commended.

I am the manager of engineering services for a county-wide highway district in Boise, Idaho. For the last four years we have been grappling with the problem of how to reduce the contract time on rebuilding our roads and bridges. The primary reason for this, as pointed out in the article, is due to the disruption of an already overcongested highway system resulting from major rehabilitation projects. I found the discussions of the various contracting methods that have been tried to be excellent, and the information on the time savings associated with the various methods to be very helpful.

My primary reason for writing this discussion is because in the section on "Bidding on Cost/Time Combined with Incentive/Disincentive" (regarding the $A + B$ plus *I/D* method), the authors had no specific examples and implied that this was due to the relatively small number of examples of this method that were available. We tried this method very successfully on a major bridge rehabilitation project that was constructed between October of 1993 and May of 1994.

The project was the Americana Bridge replacement over the Boise River at a cost of $2,500,000. (A portion of this cost had to do with the connecting roads and an intersection; the cost of the bridge itself was $791,401.) The project replaced a four-lane bridge that was built in 1950. The old bridge was built to 1949 design standards (American Association of State Highway Officials H 15-S12-44 loading). As a result, the interior stringers had insufficient strength to carry today's legal loads. In addition, the bridge had severe safety problems, primarily related to inadequate sidewalks for the pedestrian and bicycle traffic that used it because of its close proximity to two major parks. The highway district determined that it would have been uneconomical to rehabilitate the existing bridge and a decision was made to replace it.

The bridge was replaced by a very innovative bridge designed by Joseph C. Keller, P.E., from Higgins Engineers, Inc., a local consulting firm. The contracting company that built the bridge was Concrete Placing Co. (CPC) of Boise, Idaho. The new structure is a five-span structure supported on two intermediate piers and integral abutments with two 15 ft approach spans on either end. The approach spans cross over a greenbelt path on both ends of the bridge. The bridge has no expansion joints or bearings, and the 203 mm (8 in.) deck is continuous. The main structural components are 60 in. deep prestressed bulb-tee girders on 7 ft 9 in. centers. The live loads (based on the American Association of State Highway and Transportation Officials bridge design specifications for HS25 loading) are carried by the composite section. The bridge's overall length is 95 m (311 ft 3 in.) and it is 26 m (85 ft 4 in.) wide. The finished bridge has four through traffic lanes (two in each direction), a turn lane, two 1.5 m (5 ft) bike lanes, a 2.4 m (8 ft) sidewalk on the upstream side, and a 1.7 m (5 1/2 ft) sidewalk on the downstream side. Although this design resulted in some additional costs in the design and construction, we expect that these costs will be more than made up in reduced maintenance requirements over the life of the bridge.

The contract, as mentioned before, used the $A + B$ plus *I/D* method. To utilize this method, our traffic service department did a small study to estimate what the daily cost to the public was of having half of the bridge closed versus a total closure. A very conservative $1,800 per calendar day was calculated for the half closure. We are sure the true costs were much more than that, but we decided to be conservative. For selecting the low bidder, the dollar amount of bid A was added to the total number of days proposed by the bidder, multiplied by $1,800. The winning contractor, CPC, bid $2,075,190.55 and 355 days for the contract duration. The highway district estimate of construction time was 365 days. With the help of some very good weather during the construction period and a very low river—but primarily due to very good cooperation between the contractor and the highway district—construction was completed 172 calendar days ahead of the adjusted contract completion date. This resulted in an incentive payment to the contractor of 172 days × $1,800 per day, for a total incentive payment of $309,600. The highway district was very pleased with the outcome, as were many motorists and businesses in the area.

Another benefit of such a contract, not discussed in the article, is it results in an incentive for a contractor not to hold up proceeding on the project when minor disputes arise. For example, I, as the resident engineer, determined that the standard specification for compaction of material behind the abutments was inadequate and I made a decision that special equipment should be used—that being a Hoe Pack mounted on a large backhoe. In this instance, we could have easily spent several weeks resolving this issue; however, the contractor had every incentive not to delay progress of the contract. Consequently, it resulted in no delay whatsoever. There were numerous other similar examples that occurred during the progress of this project. I believe that the nature of the contract not only provided incentive for both the highway district and the contractor not to allow any delays, but was also one of the reasons why we had very few change orders on this project.

This is a very good example of a win-win situation for both the contractor and the highway district, and it should be added to the files of the authors of the subject article. This type of a contract is not always appropriate, but in instances such as the one previously described where a detour is not readily available, I would recommend it for consideration.

Closure by Zohar J. Herbsman,[5] Member, ASCE

The case study and the comments of Mr. Brown are very beneficial and show the potential for success of the $A + B$ method. The writer has analyzed 101 projects that were selected using the $A + B$ method and the results support Brown's opinions. The results of the writer's research were published in the December 1995 issue of the *Journal of Construction Engineering and Management* under the title "$A + B$ Bidding Method—Hidden Success Story for Highway Construction" (found on pages 430–437).

The writer agrees with Brown that the $A + B$ method is a win-win situation and hopes that more projects will be contracted using this method.

[a]September 1995, Vol. 121, No. 3, by Zohar J. Herbsman, Wei Tong Chen, and William C. Epstein (Paper 8672).

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