Detection Model for Unbalanced Pricing in Construction Projects: A Risk-Based Approach

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Abstract: Unbalanced pricing of bid line items is considered an undesirable practice by owners and may lead to rejection of the bid on the basis of nonresponsiveness to the bidding regulations. This paper presents the development of a detection model to help owners detect objectionable unbalanced bidding. The proposed model quantifies the risk afforded by deviations of the actual quantities of work from the estimated quantities of the bid line items. The proposed model also considers the impact of multiple uncertainties in line item quantities on the owner’s total project cost based on the unit prices submitted by all the bidders for the project. Historical deviations from the estimated quantities during previous construction projects are used as an indicator of future fluctuations in the estimated quantities. The proposed model allows uncertainty in the quantities of work to be incorporated into the bid evaluation stage to assess each bidder’s likelihood of being the truly lowest bidder (i.e., yielding the lowest cost to the owner). An application example, based on actual bid results submitted to the California Department of Transportation, was used to illustrate the effectiveness of the model in detecting objectionable unbalanced bids. The model is expected to provide much needed support for owners in the bid evaluation stage and to reduce the controversy around unbalanced pricing because it targets material unbalancing rather than the whole practice of unbalanced pricing. DOI: 10.1061/(ASCE)CO.1943-7862.0001203. © 2016 American Society of Civil Engineers.

Author keywords: Unbalanced pricing; Skewed bidding; Bid pricing; Competitive bidding; Detection model; Construction projects; Contracting.

Introduction

The process of manipulating the price of bid line items by enhancing the price of some items and simultaneously lowering the price of other items without affecting the total bid price is widely known as unbalanced pricing. The most common motives for unbalanced pricing are minimizing the financing cost of the project and increasing the contractor’s profit. To achieve the first objective, the contractor overprices the items that will be performed earlier in the project and underprices the items that will be performed at the later stages of the project. This procedure is known as front-end loading or cash flow unbalancing. The second goal is achieved by examining the estimated quantities provided by the owner in the bidding documents in order to increase the unit prices of items that are underestimated and reduce the unit prices of items that are overestimated. This is known as quantity error exploitation or individual rate loading.

To illustrate the impact of quantity error exploitation, consider the following real-life example that was found during a review of contracts awarded by the Florida Department of Transportation (FDOT) in 1995 (FDOT 1997). In one of the contracts, the estimated quantity of sheeting to support trench sides in a drainage pipe installation project was 152.4 m (500 ft), while the actual quantity turned out to be 527.0 m (1,729 ft) of sheeting. The unit price of the successful contractor was $1,377.95 per meter ($420 per foot), although the average unit price of all bidders for that item was $561.02 per meter ($171 per foot). Accordingly, the FDOT paid $516,180 for the additional quantities. If the unit price of the successful contractor for this item was the same as the average unit price of all bidders for this item, the FDOT would have paid $210,159. As a result, the FDOT paid more than $300,000 undeservedly due to the failure to detect the imbalance in the bids.

Unbalanced pricing is considered an undesirable practice by owners. However, unbalanced pricing is not prohibited completely. Bidding regulations for public construction projects differentiate between two categories of unbalanced bids: mathematically unbalanced bids and materially unbalanced bids. A mathematically unbalanced bid is a bid containing a lump sum or unit bid items that do not reflect their reasonable actual costs plus a reasonable proportionate share of the bidder’s anticipated profit, overhead costs, and other indirect costs. On the other hand a materially unbalanced bid is a bid that generates a reasonable doubt that awarding the project to the bidder submitting a mathematically unbalanced bid will result in the lowest ultimate cost to the owner (CDOT 2011; AZDOT 2008). A review of the position of state departments of transportation (SDTs) regarding unbalanced bidding reveals that it is not tolerated when it poses potential detriment to the department. The standard specifications of many SDTs generally accept mathematically unbalanced bids unless it is also materially unbalanced (WisDOT 2011; NVDOT 2001). The specifications of many SDTs include provisions that materially unbalanced bids must be rejected (ODOT 2013; WisDOT 2011; NJDOT 2007). Therefore, the criteria for accepting or rejecting an unbalanced bid is risk based because the definition of a materially unbalanced bid involves the potential risk to the owner.

Bidding regulations for public construction projects require evaluation and analysis of the submitted bids to determine if such

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Note: This manuscript was submitted on January 7, 2016; approved on May 24, 2016; published online on July 14, 2016. Discussion period open until December 14, 2016; separate discussions must be submitted for individual papers. This paper is part of the Journal of Construction Engineering and Management, © ASCE, ISSN 0733-9564.