

BEFORE THE  
MARYLAND STATE BOARD OF CONTRACT APPEALS

Appeal of GENSTAR STONE )  
PAVING PRODUCTS COMPANY )  
 ) Docket No. MSBCA 1532  
Under SHA Contract No. )  
B-780-501-477 )

July 9, 1991

Equitable Adjustment - Variation in Estimated Quantities - The language of the variation in estimated quantities clause of a contract requires the party moving for an equitable adjustment to show that there has been an increase (or decrease) in costs for the quantity above 125% of the estimated quantity through comparison of actual costs before and after the 125% threshold. Comparison of the bid price with costs above 125% of the estimate is not appropriate since there is no requirement in competitive bidding that the bid price for an estimated quantity item reflect the actual cost of such item.

APPEARANCES FOR APPELLANT:

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OPINION BY CHAIRMAN HARRISON

Appellant timely appeals the State Highway Administration's (SHA) determination of entitlement to an equitable adjustment pursuant to the Variations in Estimated Quantities clause of the contract.<sup>1</sup>

Findings of Fact

1. The Variations in Estimated Quantities clause of the contract, GP-4.03 provides:

Where the quantity of a pay item in this contract is an estimated quantity and where

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<sup>1</sup>At the request of the parties the appeal is limited to the issue of SHA's entitlement to an equitable adjustment.

the actual quantity of such pay item varies more than 25 percent above or below the estimated quantity stated in this contract, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variation above 125 percent or below 75 percent of the estimated quantity. If the quantity variation is such as to cause an increase in the time necessary for completion, the procurement officer shall, upon receipt of a written request for an extension of time within 10 days from the beginning of the delay, or within a further period of time which may be granted by the procurement officer before the date of final settlement of the contract, ascertain the facts and make the adjustment for extending the completion date as in his judgment the findings justify.<sup>2</sup>

2. On July 3, 1986 SHA awarded the contract to Appellant to make improvements to a 2.12 mile multi lane portion of 1-695 from 1-83 to Charles Street in Baltimore County. The contract required traffic flow to be maintained while the work was being performed.

3. Appellant's total bid was \$5,951,622 including a \$900.00 unit price bid for an estimated number of days for arrow board<sup>3</sup> under Bid Item No. 1006. Appellant's bid for Bid Item No. 1006 appeared in the Schedule of Prices in the bid documents as follows:

Item Nos.	Approximate Quantities	Description of Items	Unit Price Dollars.Cts	Amounts Dollars.Ct
1006	200	Per Unit	900:00	180,000:00
		Day	:	:
		Arrow	:	:
		Board	:	:

<sup>2</sup> Section 13-218, State Finance and Procurement Article mandates the inclusion of such a clause in State contracts. The language of GP-4.03 is that required by COMAR 21.07.02.03 for construction contracts.

<sup>3</sup> An arrow board is a diesel or solar power generated flashing traffic control device with lights forming an arrow to indicate direction on a panel mounted on a two wheel trailer. The arrow board is used to direct traffic to open lanes when other lanes are closed to accomplish the improvement work.

4. While the estimated (approximate) quantity or number of unit days of arrow board in Bid Item No. 1006 was 200 days, the work actually required 514 unit days of arrow board use. Of the 514 unit days, 264 unit days represent the overrun above 125% of the estimated quantity.<sup>4</sup>

5. In compiling its bid for Bid Item No. 1006 pertaining to unit days of arrow board use, Appellant included costs for arrow board, labor and equipment predicated on an assumption that 555 unit days of arrow board placement or use would be necessary including employment of a maintenance of traffic crew for 327 of these days. Maintenance of traffic crew costs (foreman, laborers, flatbed, pickup) were calculated to be \$783.00 per day. The daily cost of arrow boards was calculated at \$45.00 a board. Appellant then multiplied the \$783.00 daily crew cost by the estimated 327 maintenance of traffic crew days yielding \$256,041.00 and multiplied its estimated 555 arrow board unit days times \$45.00 yielding \$24,975.00. The combined cost of labor and arrow board thus computed totaled \$281,016.00. Appellant divided the \$281,016.00 by the 555 unit days of arrow board it estimated would be necessary thus deriving a unit price for Bid Item No. 1006 of \$506.00. Appellant then marked up the \$506.00 unit price to \$600.00, and, on the assumption that one third of the 555 arrow board days would require two (2) arrow board crew shifts,<sup>5</sup> increased the unit price to \$800.00.<sup>6</sup> To this amount Appellant added \$100.00 for overhead and profit to derive the \$900.00 bid price appearing in its bid.

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<sup>4</sup> The work required 514 unit days of arrow board. 125% of the estimated 200 unit days is 250 unit days. Thus the overrun was 264 unit days (514 - 250 = 264).

<sup>5</sup> Arrow board was measured for payment for use in a twenty-four hour period. See Invitation for Bids, p. 217. Appellant believed it might be required to use an arrow board in the daytime with one crew, have the arrow board removed, and then be required to use the arrow board at night with a different crew.

<sup>6</sup> The figure as actually appearing in Appellant's bid tabulation work sheets is \$801.00.

6. Other maintenance of traffic items were included in Appellant's lump sum bid of \$67,500 for Bid Item No. 1002, Maintenance of Traffic. These items included barrels, striping, sandbags for the arrow board, inlets and an estimated 30 days for maintenance of traffic crew work not involving arrow board use.

7. After the work was substantially completed, SHA, on November 27, 1987, wrote Appellant and requested an equitable adjustment pursuant to the Variations in Estimated Quantities clause. To calculate the amount of the adjustment SHA reviewed 15 to 20 bids which contained a line item for an estimated quantity of unit days of arrow board submitted by other contractors during the same construction season.<sup>7</sup> The average bid price for a unit day of arrow board derived from the bid prices reviewed by SHA was \$55.00.<sup>8</sup> Based thereon, SHA calculated an equitable adjustment or credit of \$845.00 per day by subtracting the \$55.00 average bid price from Appellant's bid price ( $\$900.00 - \$55.00 = \$845.00$ ) for the 264 Arrow board unit day overrun in the total amount of \$223,080.00 ( $264 \times \$845.00 = \$223,080.00$ ) and has withheld this amount as retainage.

8. At the hearing, SHA presented testimony from Mr. Dennis Allen, an expert in construction accounting. Mr. Allen reviewed Appellant's bid tabulation work sheets which showed the aforementioned cost estimate of \$801.00 per unit day of arrow board. Notwithstanding Appellant's estimate, Mr. Allen concluded from a review of Appellant's internal equipment rate schedule, Superintendent's daily reports and a cost analysis prepared by Appellant that Appellant's actual costs per unit day of arrow board

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<sup>7</sup>Appellant's bid was the sole bid received for the captioned contract. Therefore no comparison could be made to other bids for Bid Item 1006 on the instant project.

<sup>8</sup>Curiously, the record reflects that SHA issued an Extra Work Order pursuant to which Appellant was to be compensated at the rate of \$480.00 per day for 130 arrow board days on a follow on related project in June, 1988. As discussed below the record reflects SHA's understanding that cost of arrow board is not quantity sensitive, i.e. remains constant in cost despite an increase in estimated quantity. \$480.00 thus presumably represents SHA's belief in mid 1988 concerning the actual cost for a unit day of arrow board.

were \$76.00.<sup>9</sup> In Mr. Allen's opinion there would be no decrease (or increase) in the unit cost of an arrow board day resulting from the excess number of actual arrow board days over the estimated number of days set forth in the bid documents. In Mr. Allen's opinion there was a \$385.00 per unit day decrease for the 264 day overrun period in the cost of other maintenance of traffic work he assumed was included in Appellant's bid for arrow board.<sup>10</sup>

#### Decision

The appeal involves a dispute concerning how to apply the Variations in Estimated Quantities Clause, GP 4.03.

This clause applies to a variation above 125 percent or below 75 percent of the quantity estimated in the contract. Here, the 200 estimated number of days of arrow board use (Bid Item No. 1006) was overrun by over 125%<sup>11</sup> and an adjustment was requested. In order for a party to be entitled to an equitable adjustment, however, there must be an increase or decrease in costs, for the quantity above the 125% threshold, due solely to the variation in

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<sup>9</sup>Based on his review of Appellant's records Mr. Allen calculated a labor and equipment cost of \$20,571 for total arrow board placements and removals and a cost for arrow board use of \$18,592. He then divided the resulting sum \$39,063 (\$20,471 + \$18,592 = \$39,063) by the total number of arrow board unit days, 514, to arrive at \$76.00 (\$39,063 divided by 514 = \$76.00).

<sup>10</sup>In making this determination Mr. Allen first multiplied the Appellant's \$801.00 estimated bid costs by the 200 estimated unit days for Bid Item No. 1006, yielding \$160,200. He then multiplied the \$76.00 unit day arrow board cost he had derived by the 200 estimated unit days, yielding \$15,200. Mr. Allen then subtracted \$15,200 from \$160,200, yielding \$145,000. He then divided \$145,000 by 200, yielding a cost per unit day of \$725.00 for 200 days. Next Mr. Allen took \$213,767 in costs for maintenance of traffic items (exclusive of arrow board) incurred for the entire job as extracted from Appellant's cost records and subtracted from this amount the amount of \$39,064 derived from multiplying his \$76.00 figure for daily cost of arrow board times 514 total number of days of arrow board use. Mr. Allen then divided the resulting figure of \$174,703 by 514 to arrive at a unit day cost of \$340.00. He then subtracted \$340.00 from \$725.00 resulting in his asserted \$385.00 decrease.

<sup>11</sup>As noted above, the work required 514 unit days of arrow board. 125% of the estimated 200 unit days is 250 unit days. Thus the overrun was 264 unit days (514 - 250 = 264).

estimated quantity.<sup>12</sup> In order to determine whether there has been an increase or decrease in cost due solely to the variation, comparison of actual costs for the quantity of the particular item involved before 125% and actual costs for such item after 125% must be undertaken. In this case, Appellant and SHA agree that the actual costs per unit day of arrow board before and after the 125% threshold should remain constant; i.e. the per unit day cost of arrow board does not fluctuate based on the number of days of use. However, SHA did not employ an analysis of actual costs. The procurement officer examined line item bids for unit days of arrow board in other procurements during the 1986 construction season and determined that an average of \$55.00 per unit day had been bid. The procurement officer assumed that there was a direct relationship between the \$55.00 average bid price for unit days of arrow board and actual cost. As noted in the procurement officer's final decision:

We reject Genstar's interpretation . . . .  
An equitable adjustment under the Variations clause is achieved by determining the reasonable cost of performing the work in excess of 125% of the estimated quantity and adding a reasonable profit to those costs to arrive at the equitably adjusted unit price applicable to the overrun quantity. If the equitably adjusted unit price is higher than the contract unit price, the contractor is entitled to an upward adjustment of the contract unit price for the excess quantities. Conversely, if the equitably adjusted unit price is lower than the contract unit price, SHA is entitled to a downward adjusted unit price for the excess quantities.

Since Genstar has not provided Sha with information concerning its actual unit day

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<sup>12</sup>The instant opinion is confined to an overrun situation. Where the actual quantity required is less than 75% of the estimated quantity there are no before and after actual costs to compare.

costs incurred for the overrun quantity of arrow board, SHA is forced to use its own reasonable estimate of those costs. SHA has determined that the unit day costs appropriately incurred under this item, including a reasonable overhead and profit, is \$55.00.

Genstar is entitled to payment at the \$900 contract unit day price for 125% of the estimated quantity of 200 unit days, or 250 days. For the 264 unit day overrun, Genstar is entitled to an equitably adjusted unit price of \$55 per unit day. The difference between the \$900 contract unit price and the equitably adjusted unit day price of \$55 is \$845. Accordingly, SHA is entitled to retain \$845 x the 264 day overrun, or \$223,080.

This approach, albeit productive of a different result, was echoed at the hearing by SHA's expert witness, Mr. Allen, who began his analysis from Appellant's bid tabulation sheets which showed a bid cost estimate of \$801.00 per unit day of arrow board. Mr. Allen then determined that Appellant's actual costs per unit day of arrow board were only \$76.00 taking certain discreet costs from Appellant's records. Mr. Allen then compared the \$725.00 in costs remaining in Appellant's bid estimate ( $\$801.00 - \$76.00 = \$725.00$ ) to the total actual costs incurred on the project from Appellant's records for maintenance of traffic items (other than the discreet items which he attributed to arrow board in deriving his \$76.00 unit day arrow board costs) and determined a decrease in costs for the 264 unit day overrun of \$385.00.<sup>13</sup> Mr. Allen's and SHA's numbers (\$845.00 v. \$385.00) vary greatly. Neither analysis as required by GP-4.03 compare actual cost incurred before and after the overrun quantity was reached. Both analyses are flawed by the assumption that a bid price is reflective of actual costs and that the cost for the overrun quantity should be compared to the bid

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<sup>13</sup> Mr. Allen's methodology used to generate the asserted decrease in costs of \$385.00 is set forth in Finding of Fact No. 8, Footnote 8.

price.<sup>14</sup>

However, there is no requirement that a bidder's bid in a competitive sealed bid procurement reflect the actual costs of any item of work. In competitive bidding the bidders are permitted to exercise subjective judgment and risk taking to make their bid price competitive and enhance competition.<sup>15</sup> The record herein reflects just such subjective judgment and risk taking by Appellant.

This contract has several bid items which relate to maintenance of traffic work. For instance, Bid Item No. 1002, Maintenance of Traffic was a lump sum item. The standard specifications for maintenance of traffic contains descriptive language similar to the Special Provision for Arrow Board. The record reflects that this overlap of function lead to judgment and risk taking in the Appellant's strategy of bidding. In this case (in hindsight) the SHA estimate of the number of days of arrow board use was less than half of the number of days actually required. If a bidder perceives this underestimate and makes a judgment to bid low on the lump sum Item 1002 and high on the estimated quantity Item 1006 he accepts this risk of his bid if it is accepted. It is not the intent of GP-4.03 to allow either party the opportunity to renegotiate in hindsight a bid price when the

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<sup>14</sup> SHA, lacking Appellant's actual cost records at the time it generated its calculation of an equitable adjustment, compared Appellant's total bid price (including overhead and profit) to an assumed average unit day cost for arrow board of \$55.00 derived from bid prices from other contractors for arrow board. Mr. Allen who had Appellant's cost records compared the cost portion of Appellant's bid price with an average daily cost he derived based on certain assumptions about Appellant's total actual costs. Thus even assuming arguendo that a bid price represented the actual cost for the work up to 125% of the estimated quantity no attempt was made to compare such cost to the cost of the overrun quantity.

<sup>15</sup> A bid may be rejected, however, if the price is unreasonable or if the procurement officer determines that a bidder is nonresponsible because unit prices contained in a bid are unbalanced. See COMAR 21.06.02.03B; SHA GP-2.15; James Julian, Inc., MSBCA 1514, 3 MSBCA ¶ 245 (1990).



actual cost is found to be too high or too low due to the variation in actual quantity necessary from the quantity estimated in the bid documents. The economies of scale are reasonably anticipated under GP 4.03.<sup>16</sup> However, it is only the actual increase or decrease in costs for the quantity that exceeds 125% of the estimate based on a comparison of actual costs before and after 125% of the estimated quantity is reached and due solely to the variation in quantity that GP 4.03 gives as a remedy.<sup>17</sup> It is not an escape hatch from a bid price which in hindsight was a "bad deal" for either party.

SHA has failed to show a decrease in the costs for the 264 unit days of arrow board overrun due solely to the variation in quantity. SHA never compared actual costs incurred before and after the 125% threshold. SHA has only shown that if you compare a list of particular segregated actual costs incurred during the

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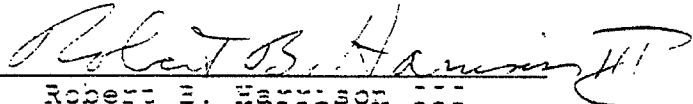
<sup>16</sup> The record reflects the parties belief herein that the cost of arrow board does not vary with quantity. Presumably, the cost of most estimated quantity bid items is affected by quantity.

<sup>17</sup> In other words a contractor is entitled to be paid its bid (contract) price up to 125% of the estimated quantity. Relief for the moving party relates only to the quantity above 125% of the estimate based on a comparison of actual costs before and after 125% is reached. See Dick Corporation and Sofis Company, Inc., MSBCA 1472, 3 MSBCA ¶ 267 (1991). For example: A bidder bids \$200 per unit for an estimated quantity of 200 units of X (X being a truly quantity sensitive item relative to its actual unit cost). The work requires 400 units of X. There is thus a 150 unit overrun beyond 125% of the 200 estimated units. The actual per unit cost of the first 250 units (i.e. 125% of the estimated quantity) is \$150.00 per unit. The actual per unit cost of the 150 unit overrun due solely to the variation above 125% of the estimated quantity is \$120.00 per unit. SHA moves for an adjustment. The adjustment would be calculated as follows. The \$150.00 cost per unit before the overrun would be compared to the \$120.00 per unit cost after the overrun and SHA would be entitled to an equitable adjustment of \$4,500.00 ( $\$150.00 - \$120.00 = \$30.00$ ;  $150 \times \$30.00 = \$4,500.00$ ) based on the lower unit cost for the overrun units. SHA would not be entitled (as it claims in this appeal) to an adjustment based on the \$80.00 difference between the \$120.00 per unit cost of the overrun units and the \$200.00 per unit bid price.

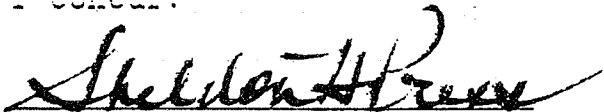
514 days of arrow board use there is a decrease from the bid price. However, this analysis is not in concert with the actual cost comparison required by GP-4.03.


Since we have determined that SHA has not shown that there was a decrease in the unit cost of arrow board due solely to the variation above 125% of the estimated quantity it follows that SHA is not entitled to an equitable adjustment based on the record before the Board. The appeal is thus sustained and remanded to SHA for appropriate action.

Dated: July 9, 1991

  
Robert B. Harrison III  
Chairman

I concur:

  
Sheldon H. Press  
Board Member

  
Neal E. Malone  
Board Member

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I certify that the foregoing is a true copy of the Maryland State Board of Contract Appeals decision in MSECA 1532, appeal of GENSTAR STONE PAVING PRODUCTS COMPANY, under SHA Contract No. B-780-501-477.

Dated: July 9, 1991

*Mary J. Priscilla*

Mary J. Priscilla  
Recorder

*mc*