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OPINION BY MR. KETCHEN

This appeal concerns a claim for additional compensation to auger piles during their driving in the construction of a new steel bridge. Appellant maintains that the State Highway Administration (SHA) agreed to pay for extensive, additional augering in lieu of agreeing to authorize and pay for a heavier gauge pipe pile in modification of the original contract agreement.

Findings of Fact

1. SHA awarded Contract No. P-878-504-372 to the Driggs Corporation (Appellant) for the construction of a new steel bridge and for the widening and re-decking of certain existing bridges on Interstate 295 over Interstate 95 in Prince Georges County, Maryland.

2. Under the terms of the contract, Appellant was required to install cast-in-place concrete pipe pilings for the piers and abutments of the new bridge. Appellant performed this work through its subcontractor, G.A. & F.C. Wagman, Inc., (hereinafter referred to as Appellant).

3. Installation of the pilings required the placement of pipe castings (also called pipes, castings, shells, or pipe shells) or

monotubes. The Special Provisions of the contract required the use of pipe castings having approved deformations and tapered tips (monotubes)<sup>1</sup> or, at the contractor's option, the use of pipe castings without deformations and with flat tips (pipe castings). The pipe castings were to have a minimum shell thickness of seven gauge. Under the contract's terms, if the contractor elected to use pipe castings and was not successful in achieving an acceptable pile foundation, it was obligated to use the specified monotubes at no additional compensation. (Special Provisions p. 106).

In layman's terms, the pile driving process involves the driving of pipes into the ground with a large, machine type hammer until a strata of earth is reached that is capable of bearing the load required by the contract specifications. The casing or shell of the pipe is the outside perimeter of the round pipe into which the concrete is ultimately poured to form the pile and the gauge refers to the thickness of that shell or casing. The Special Provisions also provided:

The minimum safe bearing value, minimum penetration into original ground and estimated tip elevation for all piles are indicated on the Plans. However, the Minimum Safe Bearing Value and Minimum Penetration into original ground MUST be achieved for each pile. If the "estimated

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<sup>1</sup>Monotube piles are pipe piles with indentations having a certain width and shallow depth running lengthwise in the side of the pile (i.e., deformations). Deformations provide a gap between the side of the pile and the ground. This allows easier driving due to reduced friction between the pile and adjacent soil across the area of the indentation.

tip elevation" is not achieved or is exceeded while achieving the Minimum Safe Bearing Value and the Minimum Penetration required, the pile will be considered satisfactory. (Special Provisions p. 107).

This paragraph established the absolute requirement of pile load carrying ability as measured by minimum safe bearing value, and also established the minimum length of penetration of the pile into original ground. Estimated tip elevation, however, was set forth as a guideline and was the SHA designer's estimate or indication of how far down the pile was likely to be driven before the specified load bearing capacity was reached.

4. Importantly, the Special Provisions (p. 108) provided that the "furnishing, driving . . . handling, augering . . . of the piling (permanent and test) complete in place, will be measured and paid for at the contract unit prices bid per linear foot on the pertinent Cast In Place Concrete Piles . . ." (Underscoring added).

5. The Maryland Department of Transportation "Standard Specifications for Construction and Materials" (Standard Specifications)<sup>2</sup> dated January 1982, which were incorporated by reference into this contract (Special Provisions p. 93) contained the following relevant General Provisions (GP):

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<sup>2</sup>The book containing the Department of Transportation Standard Specifications because of its color is often referred to as the "Redbook".

**GP 605.03.05**

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Where piling must perforate strata which resists driving, the Contractor is directed and shall be prepared to auger or drill holes through same. The size of the auger or drill to be used shall not be larger than the nominal diameter of round pile of the minimum diameter of a circle in which an H pile will fit and shall meet with the approval of the Engineer before use, with the Engineer as the sole judge as to the size of auger. After the hole is completed, the pile shall be inserted; and if there exists a space between the outside of the pile and the wall of the augered hole, dry sand shall be used to completely fill the voids between the pile and the walls of the hole. Driving shall then be completed after which any remaining voids are to be completely filled with dry sand.

**GP 605.03.07**

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### Test Piles and Load Test Data Application

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If the driving of the test pile(s) indicates that a thicker shell is necessary for cast-in-place concrete piles to obtain the penetration required without failure during the driving, such a shell of required thickness shall be provided. The Contractor will be paid for the additional shell thickness but only on the basis of the differential in the manufacturer's quotation for the heavier piling, which differential shall be the net increase in cost to the contractor of the heavier piling over and above that which is specified on the Plans and/or in the Special Provisions.

### GP 605.05 BASIS OF PAYMENT

No direct payment will be made for any augering or drilling required by field conditions or if called for in the Special Provisions as cost thereof shall be included

in the pertinent piling item(s).

(Underscoring added).

\* \* \*

6. In preparation of its bid, Appellant had an opportunity to review soil borings obtained by SHA. The borings indicated layers of wet, dense sand through which piles would have to be driven. Appellant's engineer responsible for bidding this project, Mr. Donald Posey, testified that because he believed that augering would not be necessary to drive through the dense sand, he did not include the cost of augering in his bid. (SHA Exh. 6 [Posey Deposition] at 25-26).

7. Appellant began its pile driving operation using pipe piles at pier 4. After conducting a successful load test on or about May 23, 1985, it began driving production piles. When the first stage of work at pier 4 was completed, approximately 40 piles had been driven without difficulty.

8. On or about June 11, Appellant began driving piles at pier 3 and almost immediately began experiencing difficulty driving the piles to the required minimum penetration into original ground. Both Appellant's daily production reports and SHA's daily inspection reports indicated that Appellant experienced problems with its pile driving hammer during this time. Appellant's daily production report on June 17, 1985 states: "The hammer does not seem to want to drive through the sand strata at 18 thru 24 ft. One pile took 1 1/2 hrs. to drive to 30'. State

stopped us from driving at 9:30". The SHA Inspector's Daily Report from the same day reads: "Pile Hammer is in need of repair. All pile driving was shut down at 10:30 a.m. to-day [sic]."

9. Appellant unsuccessfully attempted to overcome its difficulties in driving the piles by a procedure known as overdriving. Overdriving was described as "hitting the pile harder with the hammer they were using, to try to develop enough energy to force it into the ground." (Tr. 24). However, the piles still mushroomed or crimped at the tops. (Tr. 24). Appellant then asked SHA to review the "tip elevation"<sup>3</sup> to see if it could be relaxed, but SHA denied the request to modify this requirement.

10. Appellant began, on its own initiative, to use an auger to pre-drill holes in order to determine whether the pile could be completed to a satisfactory tip elevation in this manner. Augering did, in fact, prove to be a successful method of getting the piles to the requisite penetration, once a drill with enough torque was employed. Appellant, however, wished to be paid additional compensation for augering or to be allowed to use a heavier gauge shell with attendant additional compensation. Appellant presumed a heavier gauge shell would have driven through the resistant soil strata without the need for augering.

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<sup>3</sup>By "tip elevation", Appellant presumably means the minimum penetration into the ground below which the piles must be driven as required by the contract since it is understood that estimated tip elevation is a different and distinct physical factor, and is only an estimate, not a requirement, or how far a pile will drive before the required pile bearing is reached.

11. In order to resolve its difficulty in driving the piles, Appellant next contacted SHA's then Assistant District Engineer and asked for a "direction" to go to a heavier gauge shell in lieu of augering. SHA's Assistant District Engineer replied that no such direction could be considered until Appellant attempted to drive the monotubes specified in the contract.

12. Sometime around June 25, Appellant drove a single monotube pile at pier 3. This monotube buckled.

13. On June 28, the manager of Appellant's piling division, Mr. William J. Lytle, contacted Mr. Edward J. Wrzensinski, who had just assumed the position of SHA's Assistant District Engineer, to ask for direction as to how to proceed. Mr. Wrzensinski responded that one failed monotube was an inadequate indication of the nature or extent of Appellant's pile driving problem. He suggested that Appellant continue to auger as it encountered difficulties. Unsatisfied with this advice, Mr. Lytle requested the opportunity to hold a demonstration for SHA on the job site.

14. On July 2, a demonstration attended by Mr. Wrzensinski and Mr. Lytle, and other representatives of SHA and Appellant, was held at the job site at pier 3. At this time, Appellant attempted to drive two more monotube piles which also mushroomed or crimped at the tops and thus failed to reach the required tip elevation. Mr. Wrzensinski suggested that Appellant drive some additional piles since in his opinion the total of three monotube piles so far tested had not conclusively shown the

nature of the problem. Mr. Lytle refused to drive any more piles. Mr. Wrzensinski then suggested that Appellant continue to auger as necessary and Mr. Lytle asked if this was a direction to auger. Mr. Wrzensinski answered that because augering was a contract requirement included in the specifications and the cost of augering was to be included in the contract unit price, there was no need for a special direction to auger. Mr. Lytle then requested that SHA pay for use of a heavier gauge pile. Mr. Wrzensinski responded that there had not been sufficient indication to him that a heavier gauge pile was necessary. The discussion between Mr. Wrzensinski and Mr. Lytle was summarized in Mr. Wrzensinski's diary entry of July 2, in relevant part as follows:

Meeting on job site with T.K. (Tom Kidwell)  
Bill Lytle of Wagman and acting P.E. on P-  
878-501 [sic] in regard to pile problems.  
Discussed situation with Harry Myers of  
Bridge Design and also, John Meade. I feel  
the driving records are fairly consistent,  
there is a strata of dense, brown sand  
between 21' to 25' depth and the piles take  
up temporarily. To get load bearing and  
minimum penetration I recommend augering as  
stated on p. [2] 70 of red book. Contractor  
wants to get paid for augering or go to  
heavier pile, but I disagree, meeting to be  
with Mike [Snyder].

15. Pursuant to Mr. Lytle's request, a meeting was held in the late afternoon of July 2 between Mr. Wrzensinski, Mr. Lytle, and Mr. Michael Snyder, the SHA District Engineer. Mr. Lytle presented his position that SHA had two options. SHA could authorize and pay for the use of a heavier gauge pile or, to save time and money, it could direct Appellant to auger holes for piles and pay for the cost of augering. SHA had a different view. Mr. Snyder and Mr. Wrzensinski expressed their belief that Appellant had not demonstrated that a heavier gauge shell was necessary in order to drive the specified piles to the depths required, and also reiterated their view that augering was part of the contract specifications for driving piling on a unit price basis and thus not compensable as extra work. At the close of the meeting, however, Mr. Snyder told Mr. Lytle that SHA would review the driving records immediately following the meeting as a check on its decision. Mr. Snyder also told Mr. Lytle that at the end of the job, SHA would review anything else the contractor would like to submit to see if there were any extenuating circumstances or any changes (e.g. differing site conditions) which might lead SHA to pay Appellant additional compensation. Mr. Wrzensinski's contemporaneous diary entry summarizes the meeting:

Meeting with Bill Lytle of Wagman and Mike about piles on P878-501 [sic]. Mike and I agree and we will further evaluate driving records, check specs, and advise shortly. For now we are augering and driving pipe piles.

16. After reviewing the pile driving records with Mr. Snyder and SHA inspectors, Mr. Wrzensinski determined that the driving records corresponded with what was indicated on the soil borings, i.e., there was a dense soil strata at about 21' to 25' depth that might require augering to get the pile through. In either late July or early August, 1985, Mr. Wrzensinski spoke with Mr. Lytle by telephone and told him that SHA was maintaining its position that Appellant should continue to auger as needed, but SHA would not pay the cost of doing so since this was Appellant's obligation under the terms of the contract.

17. On August 26, 1985, Mr. Snyder sent Appellant a letter regarding the July 2 meeting and pile driving demonstration and SHA's follow up review of the project records. SHA's letter informed Appellant that it was not satisfied that a sufficient number of monotubes had been tested in the early July demonstration so as to demonstrate that a heavier gauge pipe shell was necessary and that it would not agree to pay Appellant for its costs incurred for augering to get the specified piles to their proper penetration and bearing. This letter was not received by Appellant or its subcontractor, Wagman, according to their records.

18. Appellant continued to use the augering technique for driving piles as necessary, until the pile installation project was completed in early April, 1986. Approximately forty percent of the approximately 400 piles driven required augering.

19. On April 12, 1986, Appellant submitted its claim in the amount of \$211,682.00 for additional costs due to having to auger piles as an aid to driving them to the required penetration and bearing.

20. On May 13, 1987, the SHA procurement officer's final decision was issued denying Appellant's claim on the basis that the contract contained no provision to pay for augering separately from driving piles on a unit price per pile driven basis, and in fact prohibited such payment.

21. This appeal was timely filed on June 10, 1987.

#### Decision

The primary issues raised by Appellant in this appeal concern whether Appellant and SHA verbally agreed to modify their written agreement such that SHA agreed to pay Appellant for the costs its subcontractor incurred for augering piles or, alternatively, whether SHA's refusal to order Appellant to use a heavier gauge pile constituted constructive change to the contract.

SHA objects to Appellant's constructive change claim and to the legal argument made for the first time in Appellant's post-hearing brief that the contract specification for use of seven gauge piles constituted a breach of warranty that such piles could be driven at the site without the need for augering. SHA contends that because Appellant failed to

raise either of these legal arguments prior to submitting its posthearing brief to this Board, this Board lacks jurisdiction to consider them.

As this Board stated in Granite Construction Co., MSBCA 1014, 1 MSBCA ¶66, (1983), it must answer two questions when determining whether an issue before it may be considered: "First, does the issue involved flow from the claim or claims decided in the particular procurement officer's final decision serving as the vehicle for approval. Second, has notice of that issue properly been given so as to avoid surprise and permit opposing counsel to prepare a defense." Granite at 14.

We find that in this case that the failure of Appellant to characterize its claim as a constructive change or breach of warranty claim in its appeal to the procurement officer or at the hearing before this Board does not prevent it from so characterizing it in the post-hearing brief. However the claim is characterized, the essential question it raises is: Was there extra work done beyond the requirements of the contract for which Appellant should be compensated by an equitable adjustment of the contract price as provided for by the contract? Because that is the question the SHA procurement officer addressed and the one the parties addressed at the hearing before this Board, it is clearly of and flows from Appellant's claim. We find, therefore, we do have jurisdiction to consider it here under the remedy granting clauses of the contract.

We now turn to address the substantive issues. Appellant alleges that SHA led it to reasonably believe that it would be compensated for the costs of augering even though the contract stated that no direct payment

would be made for any augering required by field conditions. (Finding of Fact No. 15). As this Board held in Martin G. Imbach, Inc. MDOT 1020, 1 MSBCA ¶52 at 24 (1983): "...parties to a written contract subsequently can agree orally, through conduct or intimation, to a modification or waiver of provisions in their contract, notwithstanding a requirement that all changes be in writing. University National Bank v. Wolfe, 279 Md. 512 (1977); Hoffman v. Glock, 20 Md.App. 284 (1974); Freeman v. Stanbern Construction Co., 205 Md. 71 (1953)." The burden of proof to show the modified contract terms rests with Appellant since it seeks the affirmative of the issue. Hensel Phelps Construction Co., MSBCA 1167, 1 MSBCA ¶68 (1984). Here Appellant must establish an oral modification of the contract by a preponderance of the evidence. Sullivan v. Mosner, 266 Md. 479 (1972); Chesapeake Supply & Equipment Co. v. Manitowoc Engineering Corp., 232 Md. 555 (1963). That is, Appellant must show that the evidence it presents when fairly considered and given appropriate weight "makes the stronger impression, has the greater weight, and is more convincing as to its truth than 'the evidence in opposition thereto.'" Williams v. Superintendent, Clifton T. Perkins Hospital Center, 43 Md. App. 588, 591 (1979), quoting Black's Law Dictionary, 1404 (3d ed 1933).

Appellant has failed to sustain its burden proving that SHA agreed, expressly or impliedly, to pay it for augering. The evidence it offered in support of this contention was testimony by Mr. Lytle that at the July 2 afternoon meeting Mr. Snyder directed him to continue augering and to compile its costs so that SHA could pay for them. (Tr. 42). However, this testimony was contradicted by the testimony of Mr. Snyder and Mr. Wrzensinski, both credible witnesses. Each stated that they were

aware that Appellant wanted to be compensated for augering but did not agree that SHA was required to do so under the terms of the contract. (Tr. 100, 166). The pile driving records that Mr. Snyder requested were only going to be considered by SHA subsequent to that meeting for purposes of evaluating potential differing site conditions; that is, to see whether there were soil conditions existing at the site that might not have been anticipated. There is no differing site condition issue in this appeal and SHA's investigation did not indicate that there was a differing site condition.

Furthermore, contemporaneous documents of record maintained by SHA confirm that there was no agreement to pay Appellant for augering. Mr. Wrzensinski's diary entry for July 2 states he did not think that Appellant should be paid for augering and that Mr. Snyder agreed. It also states that SHA agreed to review the pile driving records - not the pile driving costs, as Mr. Lytle claims. (See Finding of Fact No. 14). This diary entry, is a contemporaneous, trustworthy record that we give substantial weight as evidence.

In addition, SHA's August 26 letter (Finding of Fact No. 17) clearly shows that SHA did not agree to pay Appellant for augering, regardless of whether or not Appellant received copies of it. And SHA informed Appellant earlier than this date, at the July 2 meeting, and through a telephone call by Mr. Wrzensinski to Mr. Lytle (Tr. 103) of the contents of the letter. SHA thus informed Appellant that it would not pay it for augering based on its review of the pile driving records and the contract's terms. (finding of Fact No. 16).

Appellant's evidence to support its claim consisted of the testimony of Mr. Lytle to the effect that SHA had agreed to pay it for augering at the July 2 meeting. This testimony is contradicted by SHA witnesses and contemporaneous records kept by SHA which we find credible and rely on to find against Appellant on the issue.

Moreover, SHA had no reason to agree to pay for augering because augering was included as part of Appellant's contract. The Standard Specifications state in unmistakable language:

GP 605.03.05:

"Where piling must perforate strata which resists driving, the Contractor is directed and shall be prepared to auger or drill holes through same."

and GP 605.05:

"No direct payment will be made for any augering or drilling required by field conditions or if called for in the Special Provisions as cost thereof shall be included in the pertinent piling items." (Finding of Fact No. 5).

The Special Provisions also specifically state that the cost of augering is to be included in the unit prices bid per linear foot of pile. (Finding of Fact No. 4).

\* In general terms, if a contractor fails to consider or improperly evaluates his costs based on the scope of work at the time of bid, he does so at his own risk. See generally Dominion Contractors, MSBCA 1401, 1 MSBCA ¶69 (1984) at 15. Pettinaro Construction Co., DOT CAB 1257, 83-1 BCA ¶16536. Appellant considered whether it might have to auger piles when bidding on this project. At his deposition, Mr. Posey, the person who prepared Appellant's subcontractor's bid, testified that after looking at the soil borings he determined that augering would not be necessary. Appellant therefore assumed the risk of not including the cost of augering in its bid.

Mr. Lytle also testified that when he reviewed the soil borings and saw that there were certain layers of soil that might be "tight" (difficult to drive the piles through) he made a judgment that this tightness in soil strata could be overcome by over-driving or by SHA's agreement to relax the tip elevation, i.e., the minimum penetration specified. (Tr. 21). This judgment proved erroneous. Sometime after learning that a substantial amount of augering would be required on this project, Appellant sought SHA's agreement to defray Appellant's additional costs. SHA, as was its right under the terms of the contract absent a determination that a change was warranted, declined to do so.

Appellant next argues that SHA's refusal to authorize and pay for the use of heavier gauge shells was premised upon an erroneous interpretation of the contract and caused a change in the method of performing the work under the contract. Appellant contends that this was

a constructive change which by the terms of the changes clause entitles Appellant to an equitable adjustment in price.<sup>4</sup>

In support of its constructive change argument, Appellant cites CWC, Inc., ASBCA 28847, 84-2 BCA ¶17,282 (1984) and Gil-Brown Constructors, Inc., DOT CAB 67-21, 69-2 BCA ¶7804 (1969). In both of these cases, it was held that the government's erroneous interpretation of the pertinent contract provisions had wrongly compelled the contractor to proceed with a more expensive course of action because the less expensive contractual alternative had been found inapposite by the government. In similar fashion, Appellant claims that SHA's interpretation of the contract forced Appellant to incur extra costs because it eliminated the alternative of going to a heavier gauge pipe

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<sup>4</sup>Section GP 4.05 Changes of the Standard Specifications in part states:

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(2) Any other written order or an oral order (which terms as used in this paragraph (2) shall include direction, instruction, interpretation or determination) from the procurement officer which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the procurement officer written notice stating the date, circumstances, and source of the order and that the Contractor regards the order as a change order.  
\* \* \*

(4) If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly: Provided, however, that except for claims based on defective specifications, no claim for any change under (2) above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: And provided further, that in the case of defective specifications for which the State is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.

shell, the additional cost of which SHA would have had to pay for under the terms of the contract.

The contract provisions which are the subject of interpretation in this appeal are found in the Standard Specifications, specifically General Provision 605.03.05:

Where piling must perforate strata which resist driving, the contractor is directed and shall be prepared to auger or drill holes through same.

and General Provision 605.03.07:

If the driving of the test pile(s) indicates that a thicker shell is necessary for cast-in-place concrete piles to obtain the penetration required without failure during driving, such a shell of required thickness shall be provided. (Underscoring added).

General Provision 605.03.07 goes on to say that the extra costs of going to a heavier gauge shell pile are to be borne by SHA but General Provision 605.05 says that the costs of augering are part of Appellant's bid and are to be borne by it. (Finding of Fact No. 5).

The issue raised by Appellant with regard to these provisions concerns which of these options must be exhausted before the other comes into play. That is, is the contractor required to auger and only if that

fails is SHA obligated to authorize a heavier gauge shell pile (SHA's position) or, alternatively, does SHA's obligation to provide a heavier gauge shell precede the contractor's obligation to auger (Appellant's position)?

It is well established that the government, as the author of the contract's provisions, must assume the burden of ambiguity in the language of the agreement. Gil-Brown Constructors, Inc., supra, at 36,244 citing WPC Enterprises, Inc. v. U.S., 163 Ct.Cl. 1, 6 (1963). However, the contract language here put in issue is clear and does not support the interpretation offered by Appellant. SHA was not under an absolute obligation to authorize the use of heavier gauge shells. Therefore, its failure to so authorize did not harm the Appellant and did not compel it to auger where it was not already under an obligation to do so.

To address the question concerning SHA's obligation to authorize a heavier gauge shell pile for which a contractor would be entitled to additional cost compared to the obligation of the contractor to auger without additional payment, we look at the express language of GP 605.03.07 of the Standard Specifications: "If the driving of the test pile(s) indicates that a thicker shell is necessary . . . . to obtain the penetration required without failure during driving, such a shell of required thickness shall be provided." (Underscoring added). (Finding of Fact No. 5). SHA's witness, Mr. Snyder, testified that he interpreted this provision to mean:

"...that during the driving of the test pile itself at various locations, that if you encounter a problem and you have gone through all the other necessary steps, such as augering, and that you find out that the augering itself still does not get the pile down to the tip elevation that you're looking for, that you should change the shell thickness, and that the State is willing to compensate for the changing of the thickness." (Tr. 144).

To the contrary, Appellant asserts that the provision does not only apply to test piles. (Tr. 68). It contends that augering is not required under the terms of the contract because industry practice<sup>5</sup> has not been to auger. (Tr. 67, 69-71). Instead, Appellant contends that the practice has been for minimum tip elevation requirements (here, minimum penetration into original ground) to be relaxed when satisfactory blow counts indicating sufficient load bearing capacity is achieved. It asserts that where minimum tip elevation requirements cannot be relaxed, SHA requires heavier gauge shells. (Tr. 69).

We find, however, that the contract did not require SHA to relax minimum pile penetration requirements. (Tr. 49). We further find that

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<sup>5</sup>An industry practice or trade practice may not contradict the plain meaning of a contract. Dominion Contractors, Inc., MSBCA 1041, 1 MSBCA ¶69 (1984) at 8. Compare: Applestein v Royal Realty Corp., 181 Md. 171, 173, 28 A.2d 830, 831 (1982). In any event, we find that Appellant did not establish an industry or trade practice by any credible evidence that allows minimum tip elevations required by the contract automatically to be relaxed when the load bearing capacity specified is achieved.

the contract language requiring SHA to authorize and pay for a heavier gauge shell pile expressly applies at the time of the driving of test piles and is a discretionary determination resting with the procurement officer based on the driving of the test piles. The reason for focusing on test pile data is obvious. At the time of driving a test pile the contractor is attempting to determine the length of the production, i.e., permanent piles needed. Thus, GP 605.03.04 of the Standard Specifications states: "...As a general rule, the Plan or Special Provisions will indicate penetrations, bearing values and/or tip elevations desired. From this information, the contractor shall order and drive the test piling . . . Then from the test pile data and behavior, the contractor shall order the permanent or remainder of the piling required to complete the contract . . . ." Moreover, even if SHA was willing to consider going to a heavier gauge shell it would not have been appropriate for SHA to have authorized this before it had been clearly demonstrated by the driving of test piles that this action would solve Appellant's difficulties. Even a heavier gauge shell might not have worked without augering. Appellant recognized the uncertainty involved in determining the proper size gauge if it were found necessary to go to a heavier gauge pile shell. (Tr. 40).

On the other hand, there is sufficient evidence in the record to show that the problems Appellant was experiencing with its hammer may have caused or contributed to the mashing or crimping of some of the piles it drove. Appellant's own records reveal that they were experiencing problems. (Finding of Fact No. 7). For example, the top of the second monotube pile driven by Appellant during the July 2 demonstration did not buckle but instead collapsed at the place of hammer contact. (Tr. 92).

A worn out cap block or misalignment of the pile and pile hammer can cause this. In refusing to drive more than the three monotubes, as SHA requested it to do (Finding of Fact No. 14), Appellant failed to reasonably satisfy SHA that a heavier gauge shell pile was necessary.

As Appellant recognized, ordering heavier gauge shells would have required significant expenditures of time and money. (Tr. 41). After Appellant's minimal demonstration on July 2, SHA remained unconvinced that it was necessary to incur this delay and cost. In this regard, SHA reasonably exercised its discretion under the terms of the contract by deciding that Appellant had not demonstrated that heavier gauge pipe piling was required in lieu of driving the specified piles and then augering as resistant strata was encountered.

We next address an ancillary matter of contract interpretation raised by Appellant which concerns the same provisions but focuses on their text. General Provision 605.03.05 refers to piling which must "perforate strata which resists driving" while General Provision 605.03.07 refers to the experience of "failing during driving." Appellant argues that it experienced failure of the piles during driving and not merely resistance to driving. Therefore, it argues General Provision 605.03.07 governs and triggers the requirement that SHA provide heavier gauge shells at its own expense.

We find that Appellant's distinction is obscure and unsubstantiated by anything in the record. However, assuming arguendo its validity, we reiterate our finding that Appellant failed to prove that the

piles it drove failed during driving. At the July 2 demonstration, held at Appellant's request, Appellant chose to drive only two monotubes even though the project involved over 400 piles. According to Mr. Wrzensinski, these monotubes collapsed at the hammer contact point at the top, a problem, as already stated, that could be caused by a worn out cap block or misalignment of the pile with the leads of the pile hammer. (Tr. 92). The language in Appellant's own production log describes the difficulties it experienced at pier 3 in terms that evoke the augering requirement: "The hammer does not seem to want to drive through the sand strata . . ." (Finding of Fact No. 7). Whatever Appellant understands pile failure to mean, certainly the crimping of a total of three monotubes did not reasonably demonstrate the need to change the gauge of the piles for a bridge project involving more than 400 piles across a considerable area beneath the span of a bridge 600 feet in length.

Appellant, however, maintains that the contract specifications which called for the installation of piles of seven gauge thickness constituted a warranty that seven gauge piles could be driven at the site. It contends that this warranty was breached when seven gauge piles failed during driving. As we said, Appellant did not reasonably demonstrate that the piles failed or were failing during driving. In fact, however, Appellant was able to install these seven gauges piles by driving the specified piles and by augering through soil strata where it found resistance, exactly as required by the contract. We therefore conclude that there was no breach of an implied warranty. See Granite Construction Co., supra, at 21.

In summary, SHA never ordered Appellant to auger as an extra because it was not required to do so under the terms of the contract. The contract already required augering when piles would not drive through soil strata that resisted driving. Appellant otherwise did not demonstrate by any probative evidence that the specified piles failed during driving. Nor did Appellant demonstrate that the driving of test piles indicated a thicker shell pile was necessary to obtain the required penetration without failure during driving that would have entitled Appellant to increased payment for extra work. Appellant knew at bid time from its examination of available soil boring data that augering through certain "tight" soil strata might be required on this project, if it could not drive the piles to meet the contract penetration requirements. Appellant also reasonably knew that it was assuming the risk of having to auger at its own expense by not including the cost of augering in its unit bid prices. Appellant thus gambled that it would be able to drive the piles through the tight layers shown on the contract soil borings by over-driving the piles, or, if this did not work, SHA at its request would relax the minimum penetration tip requirements specified or authorize use of heavier gauge pipe piles at increased compensation for Appellant. Appellant lost on these chances when SHA reasonably refused the requested changes it was not obligated to make.

Accordingly, for the foregoing reasons, Appellant's appeal is denied.