



Ohio Department of Transportation

1980 West Broad Street, Columbus, Ohio 43223

December 30, 2008

Jack Ford
Beaver Excavating Company
2000 Beaver Place Ave., S.W.
PO Box 6059
Canton, Ohio 44706

Re: ODOT Project 132(06) Meigs County
Claim: 10-060132-01

Dear Mr. Ford:

Enclosed is the Director's Claims Board decision on the subject claim heard on November 4, 2008.

Under the terms of the contract the Step 3 Director's Claims Board decision is the final step of the process and may not be appealed within the Department. You must either accept or reject this decision in writing to me within 30 calendar days of receipt.

Please contact me at (614) 466-3957 with any questions.

Respectfully,

A handwritten signature in black ink, appearing to read "Pam Clawson", is written over a large, stylized circular flourish.

Pam Clawson, P.E.
Claims Coordinator

c: Lindenbaum, McDonald, Swearingen, Pannett, Williams , Claims file



Director's Claims Board
ODOT Project 132(06)
Claim 10-060132-01
Concrete Cracking

Decided December 23, 2008

On Tuesday, November 4, 2008 at ODOT's Central Office in Room 3C, the Director's Claims Board ("Board") heard oral presentations of the Beaver Excavating Company ("Beaver" or "Contractor") and ODOT District 10 relative to the subject issue. Prior to the oral presentations and in accordance with the Dispute Resolution and Administrative Claim Process set forth in the contract, the Board received written documentation from the Contractor on April 25, 2008 and from the District on June 30, 2008.

The Panel consisted of William Lindenbaum, P.E., P.S., Deputy Director, Division of Construction Management; Keith Swearingen, P.E., P.S., Deputy Director, Division of Highway Operations; Tim McDonald, P.E., Deputy Director, Division of Production Management.

The District 10 representative at the hearing was Steve Williams, P. E., District 10 Construction Engineer.

Jack Ford represented the prime contractor, Beaver Excavating Company and Jeff Thompson, Jim George and Jerry Voytko represented Complete General Construction Company ("CGC"), Beaver's concrete paving subcontractor.

Tom Pannett, P.E., Esq., Acting Administrator, Office of Contracts served as the Secretary of the Board.

Pam Clawson, P.E. of ODOT's Division of Construction Management observed the hearing.

PROJECT DESCRIPTION:

This project reconfigured the USR33 and SR 7 interchange in Meigs County. Pavement for the new ramps was constructed using 9" of Item 452 Non-Reinforced Concrete Pavement, as per plan, placed on 4" of Item 442, Asphalt Concrete Intermediate Course, 19 mm, Type B (448) as per plan on 6" of Item 304 Aggregate Base. The contract was signed May 10, 2006 with an original contract completion date of June 30, 2007. The contract completion date was revised to September 4, 2007. Physical work was complete on September 4, 2007. The project bid at \$7,678,150.29 and the current amount of the contract is \$8,151,441.36.

CLAIM OVERVIEW:

The Beaver Excavating Company contracted the concrete paving construction work required for this project to the Complete General Construction Company. This claim involves the responsibility for the repair of cracks in newly placed concrete pavement.

The contract requires the Contractor to use software named HIPERPAV to determine contraction and longitudinal joint sawing time limits to protect the concrete from early cracking. Following the initial

placement of concrete pavement on the project which occurred on Ramp B, four (4) transverse mid-slab cracks were observed. These cracks developed within two days of concrete placement. The Contractor and the District assumed that a temperature drop overnight caused the cracking.

Following the next major placement of concrete pavement which occurred on the main SR124 loop six (6) transverse mid-slab cracks were observed. ODOT project personnel concluded that the cracking was likely the result of poor leveling and alignment of the dowel basket assemblies. Following the placement of concrete pavement on the USR33 ramp seven (7) mid-slab cracks developed.

The District instructed the Contractor to repair all cracked concrete pavement. The Contractor performed the corrective work while insisting it should not be at their cost. Four (4) additional mid-slab cracks appeared prior to issuance of the punch list and were also repaired by the Contractor.

The Contractor is disputing that it is responsible for the costs of performing repairs to the concrete pavement and requests \$68,369.79 for repair work it performed.

CONTRACTOR'S POSITION:

In its oral presentation the Contractor stated the concrete cracked due to excessive restraint (friction) occurring between the curing concrete pavement and the underlying asphalt concrete support layer. The Contractor also stated it had constructed the project according to ODOT's 452 specifications and through no fault of its own the concrete pavement cracked.

When the cracking problem first appeared CGC attempted a variety of approaches, such as chasing every fifth joint with a partner saw and burying the partner saw at both ends of the joint to force the pavement to crack at each joint to help relieve the pressure. As the project proceeded, the District provided several suggestions as to the cause of the cracking. CGC investigated each suggested cause ultimately ruling them out. These suggested causes included: stability of the dowel basket anchorages during concrete placement, uncut dowel basket shipping wires, skewed joints and HIPERPAV input errors.

Following paving operations CGC performed extensive research in an attempt to determine the cause of the cracking. As part of their research, CGC contacted the Transtec Group, Inc. the developer of the HIPERPAV software. The use of HIPERPAV is required by Supplement 1033 to determine sawing time limits to protect concrete from early age cracking. Section 1033.05H addresses the data inputs to be used to describe the Design Slab Support. The user is instructed to input the thickness of the sub-base and the subgrade Modulus. Choices of values for the subgrade Modulus are provided by the software. ~~CGC performed several iterations of HIPERPAV analyses with differing input values in an attempt to model the cracking that occurred in the field.~~ At the advice of Transtec, CGC input the Modulus value for a rough HMA sub-base and found that no combination of the other input parameters would allow them to pave without early cracking. CGC was informed by Transtec that: *"the restraint of that sub-base may be even higher than the HIPERPAV default and I would recommend to perform a restraint test rather than using the default value."* From this research CGC concluded that excessive friction or restraint between the asphalt base and the newly placed concrete pavement while the concrete was curing to be the cause of the cracking.

During concrete paving operations CGC had requested a change order for the application of curing compound on the surface of the asphalt base prior to concrete placement. The District would allow the

application of the curing compound but would not agree to pay for its placement. The curing compound was not applied. CGC argues that had the change order been authorized and the curing compound applied it would have reduced the friction between the concrete pavement and the asphalt base and the concrete would not have cracked. CGC also argues that since the application of curing compound is not a part of the design, the design is defective.

In support of its defective design argument CGC cites an airport project and two ODOT projects where curing compound was placed on the asphalt base. On the Rickenbacker International Airport Cargo Ramp No. 3 Reconstruction Phase 2C project and ODOT Project No. 85(07) in Delaware County on USR 23 (a research project) CGC requested and received change orders for the application of curing compound on the asphalt base to serve as a bond breaker between the two materials. CGC also cited ODOT Project No. 44(04) in Wayne County on USR 30, which had also added curing compound by change order. All three of these projects, using a bond breaker between the asphalt base and the concrete overlay, exhibited no mid slab cracking.

In further support of its position of excessive adhesion between the concrete pavement and the asphalt base CGC described difficulties it encountered while performing corrective repairs. The repairs required the removal and replacement of portions of the concrete slab. CGC stated it could not lift a 3,500 lb. pavement slab from the asphalt base with a machine with 34,000 lb. lift capacity. All slabs repaired by CGC, when pulled, had portions of the asphalt base bonded to the underside of the concrete slab.

CGC also included an article from the American Concrete Pavement Association titled "Early Cracking of Concrete Pavement – Causes and Repairs" dated 2002 in support of its position. This article discusses bonding between concrete overlay and asphalt base and states "*The potential for bonding between the concrete and subbase can be minimized with the application of a bond-breaking medium.*"

The Contractor acknowledges that the specifications envision the need for repair of cracked concrete pavement. CGC stated that it normally does not have more than a couple cracked slabs to replace on any given project and does not bid repair work into their price. Twenty-one cracked slabs are much more than a contractor would expect to see in this type of work. If the curing compound had been added to the contract repair would not have been required.

Lastly, in its arguments the District presented instances of specification non-compliance which they theorized were likely to have caused the concrete cracking experienced on this project. The Contractor provided rebuttal to each theory concluding that the non-compliances, if they occurred, were inconsequential and did not cause the cracking which is at the center of this dispute.

CGC and the District agreed to keep force account records of the corrective work. CGC requests compensation for the corrective work priced in accordance with C&MS Section 109.05 in the amount of \$68,369.79.

DISTRICT'S POSITION:

The District argues that the pavement design cross section and specification requirements were obvious in the contract. The District did not order any changes to the stated contract requirements. The Contractor did not encounter any unforeseen or differing site conditions.

Further, Section 451.16 of the 2005 Construction and Material Specification Manual (C&MS) requires the Contractor to: *“Repair transverse or diagonally cracked full depth pavement... at no cost to the Department”*. Therefore, the contractor is obligated under the terms of the contract to repair all cracked concrete pavement.

The District argued that the Contractor did not construct the concrete pavement in complete compliance with the contract requirements. The District listed the following six examples of non-compliance with the specifications, any of which could have caused cracking of the concrete:

1. The dowel basket shipping wires were not cut prior to concrete placement as required by C&MS 451.08B.
2. All dowel basket assemblies were not held firmly in place as required by C&MS 451.08B. The baskets were anchored by a metal strap and fastened to the asphalt base with Hilti nails. This system still allows some movement of the baskets. Also, on some of the work the asphalt pavement base was used as a haul road to deliver the concrete. The baskets were placed and secured after trucks furnished concrete to the work just ahead of the paver. This operation did not allow sufficient time for more than a cursory check for alignment and leveling of the baskets. Subsequent to paving, the District performed spot checks with a micro cover meter and found misaligned basket assemblies.
3. Saw cuts for the transverse joints were skewed over the dowel basket assemblies in violation of C&MS 451.08.
4. The Contractor exceeded maximum allowable joint spacing in the curved sections of the ramps.
5. Supplemental Specification 1033 directs the Contractor to make inputs into HIPERPAV. The Contractor did not perform a HIPERPAV analysis for each concrete placement and did not furnish the required files and printouts to the Engineer.
6. On the only pre-placement HIPERPAV analysis performed the Contractor made data input errors yielding inaccurate results.

Lastly, the District stated that it has consistently enforced C&MS 451.16 on projects it has constructed by requiring necessary repairs. Repairs to all cracked full depth pavement were performed at no cost to the Department. The District cited the following projects constructed between 1998 and 2007 as examples:

1. WASH-50 (13 mid-slab cracks)
2. ATH-33 (5 mid-slab cracks)
3. WASH/NBL-77 various projects (40 mid-slab cracks).

DIRECTOR’S CLAIMS BOARD FINDINGS:

I. Facts

The Board finds that the basic facts contained in the submissions and presentations by the parties are either consistent or undisputed and can be relied upon to form the basis of this decision. The following

facts are central to the decision:

1. The contract required the use of HIPERPAV software. HIPERPAV is used to predict, if, when or under what conditions concrete pavement will crack within the first 72 hours following concrete placement.
2. C&MS 451.08 requires the contractor to perform a HIPERPAV analysis and provide a file and printout to the Engineer before placing concrete pavement. The Contractor performed only one pre-placement HIPERPAV analysis and submission. This analysis was performed and submission made prior to the first placement of concrete for the project.
3. C&MS 451.16 requires the contractor to repair cracked full depth pavement at no cost to the Department.
4. The concrete pavement cracked and was repaired by the Contractor.
5. Historically, D-10 has not paid for repair of cracked full depth pavement in accordance with its interpretation of C&MS 451.16.
6. CGC did not cut the shipping wires on the dowel basket assemblies. ODOT did not require the shipping wires to be cut, although it is required by C&MS 451.08B.
7. At least some of the dowel basket assemblies were not properly aligned although CGC made reasonable attempts to achieve correct alignment.
8. Saw cuts may not have been properly made over the dowel basket assemblies normal to the centerline although CGC made a reasonable attempt.
9. Data was incorrectly entered for the HIPERPAV analysis. This analysis was not performed in accordance with the contract requirements set forth in Supplement 1033.
10. CGC performed an extensive amount research and analysis in an attempt to determine a cause for the concrete cracking; however, these efforts were made after concrete paving work had been completed.
11. The Contractor requested a change order for the application of curing compound as a bond breaker. ODOT agreed to allow its use but refused to pay for it.
12. Curing compound has been used as a bond breaker between concrete pavement and asphalt base on other similar projects.

II. Conclusions

The Board commends all the parties on the excellent job of working through this issue at the project level while continuing to move forward with construction. Proper notice was given and proper records were kept. The Contractor attempted multiple saw cutting scenarios in an attempt to limit the concrete pavement cracking.

Cracking of newly placed concrete slabs while curing is not unusual or unexpected. Any of a myriad of factors including the design of the concrete mix, the environmental conditions and the construction methods used may potentially cause cracking of concrete pavement. Even with the most conscientious construction methods and in the best environmental circumstances cracking may occur. To guarantee a final acceptable pavement, ODOT, in C&MS 451.16 notifies the Contractor that repair of cracks will be made at no cost to the Department until the C-85 or partial C-85 is issued. The Board finds this language to be a clear and unambiguous notice to a contractor that there is an expectation by the Department that a bid should also include requisite repairs.

The Contractor has pointed to the absence of a bond breaker between the concrete pavement and asphalt base, citing the friction bond, as the reason for the cracking. The Contractor further claims that this lack of a bond breaker is a defect in the design or specifications.

In order to prevail on a defective design or specification argument the contractor must first demonstrate that they did not have control over the outcome irrespective of the means and methods used or quality of work performed. The contractor must also demonstrate that it performed in accordance with all contract requirements.

In the case at hand the Contractor alleges that excessive restraint or friction between the concrete pavement and asphalt base results in differential stresses on the top and bottom of the concrete slab causing it to crack. The Board finds that the Contractor does have control over the smoothness and uniformity of the surface of the underlying asphalt base. Both characteristics impact the restraint force of the asphalt base. Additionally, the Contractor could have elected to apply the curing compound bond breaker at its own expense.

The Board was never provided an explanation as to why the only contemporaneously prepared HIPERPAV analysis in existence for this project is from the first day of paving, May 2, 2007. The Contractor, in its presentation, relied upon HIPERPAV as evidence the pavement theoretically should not have cracked. The Board discounts this argument because it is made based upon forensically developed criteria rather than data gathered prospectively as required by the specification.

The Board is not persuaded by the Contractor's defective design or specification argument.

The Board considered ODOT's responsibility to mitigate damages. The Contractor proposed a method to potentially reduce or eliminate cracking. The District permitted the Contractor to use curing compound as a bond breaker, but only at its own cost. The Board has determined the District met its obligation to cooperate with the Contractor to mitigate the cracking.

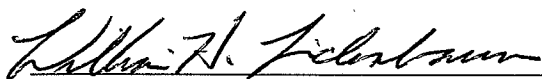
Although a tremendous amount of forensic research by both parties went into developing explanations for the pavement failures the Board was not presented with compelling evidence to justify overruling the plain terms of the contract, namely Section C&MS 451.16. Accordingly, the Board has determined that the contractor has not proven entitlement.

DAMAGES:

Based on the above findings, the Contractor is not entitled to reimbursement for damages.

This recommendation submitted this 23rd day of December, 2008.

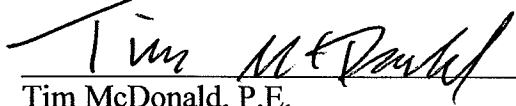
Director's Claims Board:



William H. Lindenbaum, P.E., P.S.
Deputy Director,
Division of Construction Management

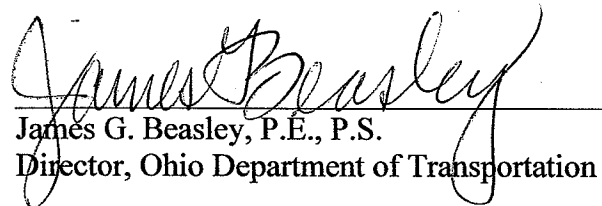


Keith Swearingen, P.E., P.S.
Deputy Director,
Division of Highway Operations



Tim McDonald, P.E.
Deputy Director,
Division of Production Management

Approval of this recommendation:



James G. Beasley, P.E., P.S.
Director, Ohio Department of Transportation

12/29/08
Date



OHIO DEPARTMENT OF TRANSPORTATION

CENTRAL OFFICE • 1980 WEST BROAD STREET • COLUMBUS, OH 43223

TED STRICKLAND, GOVERNOR • JOLENE M. MOLITORIS, DIRECTOR

February 17, 2009

Jack Ford
Beaver Excavating Company
2000 Beaver Place Avenue, S.W.
PO Box 6509
Canton, Ohio 44706

Re: Project #132(06) Meigs County
10-060132-01, Concrete Pavement Cracking

Dear Mr. Ford:

Jeff Thompson, of Complete General Construction, sent a follow up response dated January 12, 2009 to the Director's Claims Board. In that document Mr. Thompson discussed several statements in the Director's Claims Board decision dated December 23, 2008 that he found to be in error. I have discussed that document with the members of the Director's Claims Board and have attached the Board's follow up finding.

After thorough review of Mr. Thompson's documentation of January 12th and with the corrections noted in the Board's follow up finding specifically in mind, the Board still finds that the Contractor has not proven entitlement. The language in C&MS 451.16 clearly and unambiguously notifies the Contractor that repair of the cracks in concrete pavement will be made at no cost to the Department until the C-85 or partial C-85 is issued. Complete General has not provided evidence to support their claim of defective specification.

The Board's follow up finding will be included on the ODOT's Dispute Resolution and Claims web site following the original finding to recognize the Board's

Please consider this the Board's final ruling on this claim. Under the terms of the contract the Step 3 Director's Claims Board decision is the final step of the process and may not be appealed within the Department. You must either accept or reject this decision in writing to me within 30 calendar days of receipt.

Respectfully,



Pam Clawson, P.E.
Claims Coordinator

c: J. Thompson, Complete General
S. Williams, D-10
Claims folder



Director's Claims Board
ODOT Project 132(06)
Claim 10-060132-01
Concrete Cracking
Decided December 23, 2008

SUPPLEMENT TO DIRECTOR'S CLAIMS BOARD DECISION
February 17, 2009

On December 23, 2008 the Director's Claims Board issued its decision that no compensation was due the Contractor. On January 12, 2009 the Board received a document from Complete General Construction citing several errors of fact that were allegedly stated in the Board's decision of December 23, 2008.

Normally, the Board does not revisit its decisions; however, it is committed to presenting a factual representation. To that end the decision of December 23, 2008 is amended as shown herein.

SUMMARY OF CONTRACTOR'S SUBMITTAL OF "ERRORS OF FACT":

#1. In the DCB decision letter (page 2, last full sentence on the page) it was stated: "CGC had requested a change order for the application of curing compound on the surface of the asphalt base prior to concrete placement." In the "errors of fact" document, CGC submitted an e-mail from the District's Area Engineer in which he did agree that it was he that had originally raised the issue of a potential change order for the curing compound with the Contractor.

#2. The DCB decision letter states (page 3, 2nd paragraph, last sentence): "All slabs repaired by CGC, when pulled, had portions of the asphalt base bonded to the underside of the concrete slab." CGC states this should read "Complete General points out that Area Engineer, ... , noted in both Step 1 & 2 hearings that a considerable amount of asphalt subbase had bonded to the underside of the concrete slab's (sic) that were repaired".

#3 The DCB decision letter says (page 3, last paragraph): "The District did not order any changes to the stated contract requirements." CGC suggests the statement should read "The District did not order any changes to the stated contract, but did however request Complete General to use curing compound as a bond breaker at their own expense."

#4 The DCB decision letter reads (page 5 point 2): "The Contractor performed only one pre-placement HIPERPAV analysis and submission. This analysis was performed and submission made prior to the first placement of concrete for the project." In its "errors of fact" document CGC attached copies of reports from May 2, May 17, May 18, May 21, May 22, and May 29 to refute this statement.

#5 The DCB decision letter states (page 6, 4th paragraph): "The Board finds that the Contractor does have control over the smoothness and uniformity of the surface of the underlying asphalt base." CGC says in its "errors of fact" document that ... "we argued ...ODOT specified the PG64-22 binder, and 19 mm aggregate gradation. Each asphalt plant has its own approval, and ODOT approved mix designs that are unique to that plant...Because there are variations in every mix between asphalt plants, there is obviously variations (sic) in the frictions (sic) values at the interface of the asphalt and the concrete pavement. Our point was that the TRB Report emphasized the importance of in-situ testing to

determine the actual frictional values... Only in place testing can insure an accurate outcome with HIPERPAV... Neither SS1033 nor the HIPERPAV workshop class gave any guidance on determining interface frictional values when paving on asphalt. Frictional values are a function of binder type, aggregates gradations, equipment type." To support these statements CGC attached 2 pages of a TRB Report that had been submitted in their original Step 3 submittal.

#6 The DCB states in its December 23, 2009 decision (page 6, 5th paragraph): "The Contractor, in its presentation, relied upon HIPERPAV as evidence the pavement theoretically should not have cracked. The Board discounts this argument because it is made based upon forensically developed criteria rather than data gathered prospectively as required by the specification." CGC counters in its recent submittal: "The forensic HIPERPAV that was prepared and submitted after the Step-3 hearing was done for the sole purpose of showing that HIPERPAV did not predict cracking. Using actual historical data, HIPERPAV showed that the stress (sic) induced by the environment were not even close to causing cracking. This output clearly shows there were forces acting on the slab outside those covered by HIPERPAV."

#7 The DCB states in its December 23, 2009 decision (page 6, 7th paragraph): "The Board considered ODOT's responsibility to mitigate damages. The Contractor proposed a method to potentially reduce or eliminate cracking..." CGC suggests the statement should read: "The Board considered ODOT's responsibility to mitigate damages. ODOT proposed a method that was neither in the plans nor in the specifications that may have potentially reduced or eliminated the cracking. But because ODOT feared that if they were to pay for the curing compound bond breaker and it were to eliminate any further cracking, they would be liable for the initial repairs. To eliminate the District exposure to this cost, the District permitted the Contractor to use curing compound as a bond breaker, but only at its own cost."

DIRECTOR'S CLAIMS BOARD FINDINGS:

#1 After review the Board finds the last two sentences on Page 2 should be replaced by: "In a collaborative attempt to work toward the common goal of trying to reduce pavement cracking, the Area Engineer suggested the possibility of adding curing compound by change order for a bond breaker on the remaining portions of the project. The Area Engineer requested the change from the District and was told the Contractor could use curing compound but only at the Contractor's expense."

#2 There is no error in fact in the Board's statement.

#3 There is no error in fact in the Board's statement.

#4 The Board now recognizes that CGC **did** submit HIPERPAV reports for all the significant pours that were made on the project. Point #2 on page 5 should read: "C&MS 451.08 requires the contractor to perform a HIPERPAV analysis and provide a file and print-out to the Engineer before placing concrete pavement. The Contractor did submit these reports prior to the major concrete pours."

#5 There is no error in fact in the Board's statement.

#6 The entire 5th paragraph on page 6 of the Board's December 23, 2008 decision should be removed since the Board recognizes that the HIPERPAV data was received in a timely manner at the project for the major concrete pavement pours.

#7 In point #1 above the Board corrects the record to reflect that the Contractor did not raise the issue of using the curing compound as a bond breaker.

Upon careful review of the Contractor's clarification submittal of January 12 the Board finds that no new evidence was presented to justify removal of responsibility of correcting the concrete cracking from the Contractor.

Director's Claims Board:



William H. Lindenbaum, P.E., P.S.
Deputy Director, Division of Highway Operations



Keith Swearingen, P.E., P.S.
Deputy Director, Division of Construction



Tim McDonald, P.E.
Deputy Director, Division of Production Management