

GARTH L. WILSON  
ENGINEERING AND CONSTRUCTION INSIGHTS

July 3, 2009

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Boulder, CO 80302

Justin DuMond, Project Manager  
Flatiron Constructors Intermountain  
10090 I-25 Frontage Road  
Longmont, CO 80504

Reference: CDOT Project IM-0253-160  
FCI Job No. 4106


Dear Chris and Justin,

In response to your requests to the Disputes Review Board (DRB) to determine merit and quantum relative to Dispute #10 on the referenced Project, we enclose our recommendation herewith. In accordance with Subsection 105.22(g), one original signed copy of the recommendation is provided to each party.

We await further direction in this matter.

As discussed during the meeting on June 25, 2009, submittal of the pre-hearing documents for Dispute #2 and #3 is scheduled for no later than August 4, 2009 in anticipation of the next Hearing on August 14, 2009.

Sincerely,



Garth L. Wilson, Chairman  
For the DRB

Enclosures

cc: Bill Ashton  
Dick Fullerton

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## Dispute Review Board Recommendation

**DISPUTE #10 – Removal of East Frontage Road Asphalt - \$56,411.37 and zero time****Documents Reviewed:****A. Contract and Bond:**

1. Project No. IM 0253-160 Contract;
2. Special Provisions (Standard and Project);
3. Standard Specifications for Road and Bridge Construction (2005);
4. Supplemental Specifications;
5. Plans (Standard and Detailed);
6. Flatiron's Proposal;
7. Contract Modification Orders 1 through 7.

**B. Correspondence:**

1. CDOT Nuclear Asphalt – Density Correction report dated 9-30-08;
2. CDOT Speed Memo #392 dated 10-7-08;
3. Flatiron (FCI) letter dated 10-10-08 and Asphalt Specialties Co. Inc (ASCI) letter 10-9-08 attached thereto;
4. CDOT Speed Memo # 401 dated 10-11-08 (with attached letter);
5. CDOT Speed Memo #402 dated 10-13-08;
6. FCI comment dated 10-22-08 on SM #402 with attached ASCI letter dated 10-14-08;
7. FCI letter dated 10-24-08 with attached ASCI letter dated 10-23-08;
8. CDOT Speed Memo # 413 dated 10-27-08 (with attached letter);
9. CDOT Speed Memo # 429 dated 11-20-08 (with attached letter);
10. FCI letter dated 11-24-08 with attached ASCI Letter dated 11-21-08;
11. ASCI e-mail dated 12-10-08 with attached MQL results;
12. FCI Pre-Hearing Position Paper dated 6-9-09 (with attachments);
13. CDOT Pre-Hearing Position Paper dated 6-12-09 (with attachments).

**Discussion:****A. Sequence:**

FCI's paving subcontractor, ASCI, placed 564 tons of hot mix asphalt in the initial lift of pavement of the East Frontage Road from Sta. 2779+83 to 2793+00 on September 30, 2008. An entry in the CDOT Project Diary by Michael Wells for 9-30-08 notes: "1<sup>st</sup> random density at 2791+80 NB lane appears to be 89.5% by Geocals guage (sic)". An entry in the CDOT Project Diary by J. McCarty for the same day claims "several densities" had been taken and they "had very low results (86% to 89%)". Mr. McCarty also wrote: "Joe [Burrows] and I tested several more areas with failing results". At the same time, testing by ASCI was recording some nuclear density readings below 92% (ranging from 91.0 to 92.5, as reported during the Hearing). No reports for the CDOT or ASCI nuclear density test results have been provided to the DRB. Apparently, based upon the CDOT and their own low readings, ASCI suspended their paving operation.

Some reasoning developed that the base may have caused the abnormal nuclear density results. Previous paving had been performed on normal aggregate base courses whereas this pavement was being placed on a base containing recycled asphalt materials.

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An entry in Mr. McCarty's Diary for 9-30-08 claims Brad Owen (FCI), Gregg Simmons (ASCI), Mike Wells (CDOT) and Joe Burrows (CDOT) "all agreed that a new CTS (Compaction Test Section) would be a good idea". This was apparently decided in light of the "new" asphalt base type. 14 cores were taken on that day and 7 were used by CDOT as the basis for a new CTS. From a CDOT test report dated 9-30-08, densities ranged from 90.9% to 92.3 % for the core samples. A meeting was held on 10-2-08 in an attempt to resolve the issue but apparently ended in an impasse because ASCI did not agree that the 14 cores should be used after the fact for a CTS. On 10-7-08, CDOT determined that the asphalt placed on 9-30-08 was not acceptable and directed FCI to have the material removed. ASCI protested the CDOT direction with a Notice of Dispute dated 10-9-08 which was forwarded by FCI on 10-10-08.

CDOT Speed Memo 402 dated 10-13-08 requested, in light of the differing base, that an additional test section be constructed to determine the necessary rollers and number of passes required to achieve specified density (receipt by ASCI acknowledged on 10-14-08). By letter dated 10-14-08, ASCI proposed a revised roller pattern and advised it would document the new pattern and test for density after each pass (sent to CDOT 10-22-08). However, ASCI had removed the asphalt on 10-13-08 and repaved the section on 10-14-08 with 587.55 tons of hot mix asphalt. No records documenting this additional CTS have been provided to the DRB but both parties advised during the Hearing on June 25, 2009 that the CTS had been completed with satisfactory results.

On 10-24-08, FCI forwarded a Request for Equitable Adjustment (REA) dated 10-23-08 from ASCI in the amount of \$57,920.84 for the removal and repaving costs. On 11-20-08 CDOT denied that the REA had merit and, on 11-24-08, FCI expressed its rejection of that denial and forwarded a similar rejection by ASCI dated 11-21-08. Apparently, through meetings and further exchanges, resolution was not obtained so the matter was referred to the DRB.

**B. Procedures:**

Subsection 105.21 *Dispute Resolution* (as revised by CMO No. 3) provides specific steps to be taken when a dispute arises and before the issue is presented to the Dispute Review Board (DRB).

1. The DRB is proceeding on the basis that those prescribed steps have been followed.
2. No indication is made on either Pre-Hearing submittal that a copy of the Position Paper was provided to the other party as required by subsection 105.22(e) but, at the hearing, the parties confirmed such exchange was made.
3. In many respects the presentations are incomplete but clarifications obtained during the Hearing have been used by the DRB to make the following recommendation.

**C. Positions:**

1. CDOT directed the removal of hot mix asphalt placed for the East Frontage Road on 9-30-08 after bulk density tests on 7 cored samples indicated a Quality Level less than 44. CDOT stated that a CTS was needed because the Aggregate Base Course differed in material and composition from previous bases so a new correction factor for the nuclear gauges was required. CDOT used the provisions of Subsection 401.17

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*Compaction* as its authority to designate the section for a new CTS, thereby requiring cored samples to determine the Quality Level, and subsequently directing the complete removal and replacement of the asphalt.

2. FCI and its subcontractor, ASCI contend that CDOT was wrong in designating the section as a new CTS subsequent to the section having been constructed. They note that the job mix and compaction process had not changed so the need for a new CTS was not corroborated. ASCI believe the information from the cores should have been used to recalibrate the nuclear density machines only. The corrected density test results would then be used to calculate the MQL (Moving Quality Level). This would have resulted in making respective adjustment to the payment amount - not requiring removal of the material.

**D. Contract Provisions:**

1. Subsection 105.03 *Conformity to the Contract* states in part:

“When the Engineer finds the materials furnished, work performed, or the finished product are not in conformity with the Contract and has resulted in an inferior or unsatisfactory product, the work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor.”

“Materials will be sampled and tested by the Department in accordance with the sampling and testing schedules and procedures contained in the Department’s Field Materials Manual. The approximate maximum quantity represented by each sample will be as set forth in the schedules. An additional number of samples ... may be selected and tested at the Engineer’s discretion. The quantity represented by five consecutive random samples will constitute a lot whenever production schedules and material continuity permit. The Engineer may establish a lot consisting of the quantity represented by any number of consecutive random samples from one to seven inclusive when it is necessary to represent ... other unusual characteristics of the work.”

“Materials or work will be evaluated for price reduction only when deviations from specifications occur on any of the several individual tests for the lot. The several individual test values will be averaged and the percent of price reduction for the lot will be determined by applicable formula.”

“Material which is obviously defective may be isolated and rejected without regard to sampling sequence or location within a lot.”

2. Subsection 105.05 *Conformity to the Contract of Hot Mix Asphalt* states in part:
 

“When the Engineer finds the materials furnished, work performed, or the finished product are not in conformity with the Contract and has resulted in an inferior or unsatisfactory product, the work or material shall be removed and replaced or otherwise corrected at the expense of the Contractor.”

“Materials will be sampled randomly and tested by the Department in accordance with subsection 106.05 and with the applicable procedures contained in the Department’s Field Materials Manual.”

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“In the case of in-place density or joint density, the Contractor will be allowed to core the exact location ... of a test result more than  $2 \times V$  outside the tolerance limit. The result of this core will be used in lieu of the previous test result.”

3. Subsections 105.05(b), (d), (e), (f) and (h) all refer to calculations related to a “process”.
4. Table 105-2 establishes the “V” Factor for In-place Density at 1.10.
5. Subsection 105.16 *Removal of Unacceptable Work and Unauthorized Work* states in part:  
“Unacceptable work, resulting from any cause, ... shall be removed and replaced in an acceptable manner at the Contractor’s expense.”
6. Subsection 106.05 *Sampling and Testing of Hot Mix Asphalt* presents procedures for process control testing and acceptance testing including test frequency, Quality Level, procedures, standards and qualifications. Table 106-1 shows a minimum of 1 test per 500 tons is to be made to determine percent relative compaction of bituminous pavement. The Notes to Table 106-1 include: “At the Engineer’s discretion, additional random in-place density test may be taken in order to meet scheduled minimums”.
7. Subsection 401.17 *Compaction* provides in part:  
“The Contractor shall construct a compaction pavement test section (CTS) for each job mix for which 2000 or more tons are required for the project. The CTS will be used to evaluate the number of rollers and the most effective combination of rollers and rolling patterns for achieving the specified densities. Factors to be considered include, but are not limited to, the following:
  - (1) Number, size, and type of rollers.
  - (2) Amplitude, frequency, size and speed of vibratory rollers.
  - (3) Size, speed, and tire pressure of rubber tire rollers.
  - (4) Temperature of mixture being compacted.
  - (5) Roller patterns.”

“Two sets of random cores shall be taken within the last 200 tons of the CTS. ...One set of these cores shall be immediately submitted to the Engineer. This set will be used for determining acceptance of the CTS and determining density correction factors for nuclear equipment.”

“After production paving work has begun, a new CTS shall be constructed when a change in the compaction process is implemented. ...Each additional CTS shall be constructed as specified herein, and shall be sampled, tested and accepted or rejected as described herein.”

8. Subsection 401.19 *Pavement Samples* states in part:  
“The Engineer may take samples at random locations on the project for testing.”
9. Colorado Procedures (CP 44, 71, 81 and 82) describe the methods for determining specific gravity, relative compaction, quality level, and correction factor for bituminous pavement using nuclear gauges.

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**E. Evaluation:**

1. From advice by CDOT during the Hearing, no test data exists to reflect the condition (density) of the subsurface foundation because acceptance of the base material was made verbally based on visual examination during proof-rolling.
2. Compaction Test Section (CTS) Data reports dated 6-27-07 and 6-28-07 were provided for the 1<sup>st</sup> and 2<sup>nd</sup> lifts respectively. A CTS report dated 8-20-07 was also provided showing a change in placement and roller coverage but it does not indicate for what lift it is intended. Curiously, the list of QC tests provided by ASCI includes no test results for 8-20-07 which would suggest that no pavement was placed on that day. Neither party could state which compaction pattern was being employed during the placement of 9-30-08.
3. From entries made in CDOT Inspectors' Project Diaries, initial nuclear tests performed by CDOT on pavement placed 9-30-08 indicated failing results and precipitated its requirement for core samples. During the Hearing, ASCI stated that its nuclear tests on that day also showed some failing densities, but their results were not as low as CDOT's. Reports (CDOT Form #428) were not provided to the DRB by CDOT or ASCI for those initial nuclear tests.
4. CDOT was unable to confirm that the prescribed procedures for a CTS were followed including that cores were taken within the last 200 tons of the pavement placed on 9-30-08. FCI/ASCI contend that the section could not be used as a CTS because prior notification for data gathering was not given.
5. Consequently, CDOT was misguided to declare the pavement placed on 9-30-08 would be used as a CTS; particularly after the work had been completed. However, CDOT was justified in using the core test results to determine the nuclear gauge correction factor and to establish the true relative density of the material for each core sample.
6. As clarified during the Hearing, ASCI presented a comparison of the Relative Densities, Standard Deviations, Quality Level and Pay Factors as "sticky-tab" entries attached to the Nuclear Asphalt – Density Correction report (CDOT Form #469) which had been prepared by CDOT. A similar worksheet using Form #469 was not provided to substantiate results presented by ASCI but they are not being challenged.
7. No contract reference has been provided or found to substantiate the statement made in the CDOT pre-hearing document that: "A CTS is required for a change in any of the following variables: each lift, a change in actual lift thickness, a change in road base composition or changes made to the roller pattern."
8. Under the provisions of Subsection 105.03, 105.05 and 401.19, CDOT was within its contractual rights to sample and test materials as frequently as it deemed suitable. Numerous references allow for random sampling and testing.
9. Results from tests on all core samples taken on 9-30-08 confirm that the pavement generally failed to satisfy the density requirements; 5 of 7 cores taken by CDOT and 5 of 7 tested by ASCI failed to meet specifications. Of the cores taken, 4 of 8 tests in the west shoulder failed and 6 of 6 in the southbound traffic lane failed. No test results were reported on material placed in the northbound lane. The DRB considers the pavement placed on 9-30-08 to be a "lot" and the results of tests on those cores are representative of the entire lot.

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10. During the Hearing, both parties stated that a report was not submitted for the CTS performed on 10-14-08 for the replacement mat because the results were acceptable.
11. From information provided during the Hearing, payment for the HMA placed on 10-14-08 was made under Contract Schedule Item 0403. The Request for Equitable Adjustment (REA) submitted by FCI letter dated October 24, 2008 improperly includes ASCI's costs to place the same HMA. This potential for double payment should have been identified during the CDOT audit and the REA should have been recalculated using the costs for the HMA that was placed on 9-30-08, together with costs associated with removal of that material on 10-13-08.
12. The DRB is unable to verify the data purportedly contained on the disc *Voids '03* submitted by CDOT so have assumed all calculations were made accurately and in accordance with prescribed procedures and formulae.
13. ASCI explained at the Hearing that the information in the Independent Test Lab report is to demonstrate that the pavement placed on 9-30-08 satisfied the specified gradation and volumetric properties. No issue regarding these properties has been raised.
14. ASCI provided Colorado Procedure 44-05 while CDOT provided CP 44-07 but the differences between versions appear of no consequence to this issue.
15. Even numbered pages for CP-71 have not been provided.
16. Several documents have been submitted unsigned and/or undated.

**Recommendation:**

The DRB recommends that no payment be made to FCI relative to this matter based on the following:

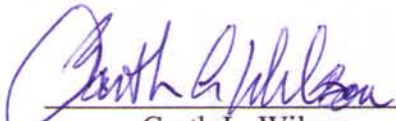
- a) The DRB deems that CDOT's use of the core samples taken on 9-30-08 was a valid means of random sampling to establish densities; particularly when nuclear tests by both parties had indicated potential problems at several locations.
- b) The DRB judges, because of the number and regularity of failures, that FCI and ASCI are incorrect in their position that the failing tests should only have been used in calculating the MQL (Moving Quality Level) to make respective adjustment to the payment amount.
- c) CDOT was within its contractual rights under the specifications to direct FCI/ASCI to remove and replace the pavement from Sta. 2779+83 to 2793+00 of the East Frontage Road because test results show material in those locations to have substandard density.

This recommendation may be taken under consideration with the understanding that:

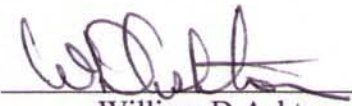
1. The DRB Recommendation was a proceeding based on presentations by the parties.
2. No fact or expert witnesses presented sworn testimony or were subject to cross-examination.
3. The parties to the DRB were not provided with the right to any discovery, such as production of documents or depositions.
4. There is no record of the DRB hearing other than the Recommendation.

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Respectfully Submitted:

  
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Garth L. Wilson

  
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Date

  
\_\_\_\_\_  
William D Ashton

  
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Date

  
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Richard Fullerton

  
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Date