**DISPUTE REVIEW BOARD REPORTAND RECOMMENDATION**

 **US 50 La Junta East – 4 Lane**

 **OTERO COUNTY, CO**

 **CDOT PROJECT NO. NH 0505-047**

**DISPUTE CONCERNING ALTERATION OF HMA MIX DESIGN AND RELATED ISSUES**

**Hearing Date:** April 28 and 29, 2014

**Hearing Location:** Martin Marietta Materials Office 2425 Wayland Place Colorado Springs, CO

**Hearing Attendees:** David Lemesany - MMM - Vice President/General Manager (4/28 only) Ted Lowder - MMM – Southern Area General Manager Terry Oliver - MMM – Area Operations Manager Dave Chelgren - MMM – Area QC Manager Todd Genovese - MMM – Division QC Manager Karen Rowe - CDOT - Region 2 Program Engineer Craig Wieden - CDOT – Region 2 Materials Engineer Bill Schiebel - CDOT - HQ Materials and Geotechnical Engineer Michael Stanford - CDOT – HQ Asphalt Program Manager Tommy Bronniman - CDOT - Project Engineer Mark Straub - CDOT - HQ Area Engineer

**Background**

On February 14, 2013 Martin Marietta Materials (Contractor) was awarded a Contract by CDOT for $4,299,485 for asphalt rotomilling, hot mix asphalt (HMA) paving, signing, striping, guardrail and miscellaneous items on approximately 6 miles of US 50 in Otero County, CO. A Notice to Proceed was issued on April 1, 2013.

Section 7 of the Contract incorporates the Plans, the Standard Specifications for Road and Bridge Construction dated 2011 and any Project Special Provisions and Standard Special Provisions.

On April 30, 2013, the Contractor submitted to CDOT its HMA mix design that had been prepared by its QC Manager, a Professional Engineer. On May 11, 2013 a revised mix design and CDOT Form 429 – Laboratory Design for Asphalt was submitted to CDOT showing an Asphalt Content (%AC) of 5.5 and Air Voids (%AV) of 3.7. On May 13, 2013, CDOT Form 43 – Project Produced Job Mix Formula, showing an Asphalt Content (%AC) of 5.7and Air Voids (%AV) of 3.3 was signed by the Contractor and CDOT.

On June 21, 2013, the Contractor submitted a Change Order Request to CDOT for extra work due to the %AC increase of 0.2 and a %VA decrease of 0.4 and other costs due to CDOT’s alteration of the HMA mix design that the Contractor had submitted. After several letters between the parties, the CDOT Project Engineer denied the Contractor’s request on October 31, 2013. The Contractor requested the disputes be elevated to the Resident Engineer on November 1, 2013. Since the disputes could not be settled at the RE level, the DRB process was initiated. Both parties agreed that the DRB hearing was for merit only.

**Joint Statement of Dispute**

Dispute #1- CDOT Alteration of the Mix Design - MMM seeks compensation for additional cost of AC from the submitted mix design versus the AC content on their CDOT Form 43.

Dispute #2- Voids are Unachievable - MMM claims voids in the mix are unachievable due to Dispute #1 and also due to the bulk specific gravity correction applied to the samples, and therefore requests compensation for monies deducted from test results.

Dispute #3 - Rejection of baghouse fines - MMM claims rejection of baghouse fines was required due to Disputes #1 and #2 which caused additional costs to retrofit their plant and additional personnel and equipment.

Dispute #4 - Delays and Financial Impacts Due to CDOT Alteration (Dispute #1) - MMM requests additional compensation for delays due to mix alteration and approval.

Dispute #5 - Failing Lottman Tests - MMM requests additional compensation for failing Lottman tests. MMM asserts failing Lottman tests are due to Dispute #3, which was caused by Disputes #1

and #2.

Dispute #6 - AT-1 Disincentive & AT-1 Passing French Rut Results - MMM seeks full compensation for the material represented by AT-1 based on the sample’s passage of the French Rut test. The sample passed the French Rut Test and AT-1 was paid at 75% of the contract bid amount. MMM requests full payment for AT-1.

Dispute #7 - Partnership Refund - MMM requests reimbursement of their portion of the Partnering Program citing multiple reasons.

**Pre-hearing Submittal**

In addition to the Plans and Specifications for the Project,both parties provided the DRB with Pre-hearing Submittals per Spec. Section 105.23(e) which included, but were not limited to, Position Papers, documentary evidence relevant to the issues, serial letters, e-mails, speed memos, test results and Colorado Procedures (CP). Both parties essentially submitted the same documents in organized binders. Both parties provided the DRB with their lists of attendees.

**Dispute #1 – CDOT Alteration of the HMA Mix Design submitted by the Contractor**

**Contractor Presentation on CDOT Alteration of the HMA Mix Design**

The Contractor said CDOT cannot deviate from the optimum HMA mix design that the Contractor submits. The Contractor is required to design to the specs and submit the design on CDOT Form 429. The mix design was done by a Professional Engineer who stamped the design and is the only one who can change it. The authority of the engineer makes him the one in reasonable charge of the design. CDOT changed the %AC from 5.5 to 5.7, a 0.2 increase. This is an alteration of the mix design and affects costs. CDOT says they can adjust the mix components but the adjustment made the mix unworkable. The question is, who is responsible for the mix if the Contractor’s mix design is changed?

CDOT did not follow CP 52. The Contractor’s Form 429 mix design was altered by CDOT and resulted in test results outside of the spec tolerance. The CDOT alteration was based on a Region 2 tool to set targets that has not been given to the outside industry and is not sanctioned by CDOT. The form used by Region 2 in setting the targets was finally received by the Contractor in December 2013. The Contractor does hundreds of mix design every year and it is the expert on its mixes. They meet the spec with their mix design which is the basis for their Bid Unit Price. The AC change was dramatic and a punitive action toward the Contractor amounting to almost $100,000.

A review of CDOT Pre-hearing Submittal, Tab R1C which lists the Form 43 Targets vs. the Mix Design Targets for CDOT Regions 2, 4 and 6 for numerous jobs, shows that CDOT increased the %AC by an average of 0.16, 0.22 and 0.20 respectively by Region and the Voids were decreased an average of 0.40, 0.59 and 0.56. CDOT says it can adjust the air voids 1%. Using CDOT’s Air Void graph on CDOT Pre-hearing Submittal, Page 2-1, shows for a %AC of 5.7 the % Air Voids is 3.3. The CDOT graph uses a linear line through test points rather than a correct non-linear line. The Contractor provided an enlarged copy of the non-linear graph for Air Voids that was a part of the mix design submittal. A correct use of the non-linear graph shows that for a %AC of 5.7, the %AV is 3.0 and not 3.3 as used by CDOT from CDOT’s linear graph. The 3.0 is well below the Region 2 average Air Voids shown in Tab R1C. This 0.3 deviation is 12% of the target band width. The rejection of the baghouse fines also affects the %AV.

CDOT’s manipulation of the %AC affects the Voids as shown on the chart on CDOT Pre-hearing Submittal, Page 2-3. CDOT’s mix alteration changed the mix design. The manipulation set the HMA up for failure. The Contractor produces 1.6 million tons of asphalt per year and has the experience. The Region 2 mix design sheet CDOT used has never been seen before.

The Contractor said CDOT did not use the specs but that the Contractor provided what the specs required. The Contractor deserves to get what the specs say. Why are small numbers so important? The %AC increase and the lessening of dust are outside industry standards. The change in the mix design by CDOT affected the HMA in-place tests. The CDOT Region 2 Target Selection Calculations Sheet and attachments have not been seen by the industry and are not in the Contract. Although the Contractor asked for the sheets, CDOT did not provide them until December 2013.

**CDOT Presentation on CDOT Alteration of the HMA Mix Design**

CDOT said this is a contractual matter. The spec has been in use for 12-15 years and CDOT followed the Form 43 design and did not change the spec. If there is a problem, the asphalt industry needs to discuss it with CDOT. The Contractor’s mix design complied with CP 52 and was stamped by a Professional Engineer. CDOT put the mix design on a Form 43 and it was signed by the Contractor and CDOT. The Contractor could have reviewed the %AC at 5.7. Form 43 doesn’t always set the %AC on what the contractors set in their mix designs. CDOT Region 2 increased the %AC 2.0 based on the averages shown in CDOT Pre-hearing Submittal, Tab R1C: FY 13/FY 14 Mix Design Submittal versus Production Targets Poll

The Contractor referenced undocumented conversations which CDOT does not remember. Form 43 set the %AC at 5.7 and Form 43 is the Contract. Bids don’t set %AC. Form 43 sets the %AC and that is what is paid. The Contract does not spec an exact Air Void %. If the Contractor had a problem with the Form 43, the Contractor should not have signed the form and should have submitted their objection.

The Contractor referenced Spec 401.02(b) concerning change in the job-mix formula by the Engineer. The mix design was not changed by CDOT. Per the specs, CDOT issued the Form 43 that was to be used on the Project for the HMA. The Contractor’s reference to Spec 401.02(b) is irrelevant. The Contractor’s reference to Spec 401.02(b) concerning changes in the job-mix formula by the Engineer does not apply because the spec relates to changes in material sources. This also applies to the other spec cites by the Contractor in their Position Paper. CDOT followed the specs and there were no changes to the Form 43.

A CDOT/Industry Task Force developed the spec in 2002. The lab prepared mix had to be adjusted to meet field conditions and the %AC was bumped up. If the spec needs changing, the industry needs to work with CDOT. Form 43 becomes part of the Contract just like a Change Order. The increase for the added AC is not a separate issue. This change can’t be made as it would affect all CDOT projects.

**Contractor Rebuttal**

There might be some mix changes that are better in the industry but for this Project CDOT made an error in the Air Voids selection and the %AC. When CDOT modified the mix design, CDOT became responsible for the HMA.

The Form 43 was signed in error and the change was not discovered until later on when CDOT made an error. After three days of production, the Contractor made a verbal request to CDOT and then followed up with the email of June 7, 2013 to CDOT which attached the Contractor’s letter of June 7, 2013 concerning Quality Levels. The Contractor handed out the emails and letter.

There were two Form 43’s on the Project. One dated 5/13/13 which lacked some info and one dated 5/15/13 to correct a CDOT mistake. CDOT said it followed the Contract. The Contractor said it followed the spec for the mix design which CDOT changed. The Contractor did not have information at bid time indicating CDOT would increase the %AC. The asphalt cement is the most expensive component of the HMA and the 0.2% increase by CDOT resulted in $95,000 in added cost to the Contractor.

The Contractor followed the specs and specials. The Contractor doesn’t see anywhere where CDOT can change the %AC. CDOT can change the voids by 1%. CDOT changed the Contractor’s mix design. By changing the %AC, CDOT made a big change in the %AV. They want to be made whole for the CDOT change. The engineer who designed the HMA mix is the only one who can change the design. This is Colorado Professional Engineer law.

**CDOT Rebuttal**

CDOT does not know if they have seen the June 7, 2013 letter or if they responded. Why did the Contractor sign the Form 43 if they questioned the numbers as stated in the June 7, 2013 letter?

CDOT referred to CDOT Pre-hearing Submittal, Tab R1C which shows that a change in voids results in a change to %AC. They don’t say it’s transparent in the way the %AC was set for the SX HMA. The Contractor met the properties later on for the HMA. CDOT followed the Region 2 procedures in developing the Form 43 which sets the %AC by Contract. CDOT said it is not required to follow the Contractor’s Form 429 mix design to set up Form 43.

The Contractor’s June 7, 2013 letter addressed %AC not voids. The changed Form 43’s did not change the targets. CDOT referred to the language after Table 403-1 which states, *Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum.* Spec 401.22 states, *When the pay item includes the PG binder grade, the asphalt cement will not be measured and paid for separately, but shall be included in the work.*

The Contractor’s initial Form 429 showed a %AC of 5.4 but the revised Form 429 shows 5.5. Based on CDOT’s historical information for job mixes, the %AC was increased by 0.2 which resulted in the Form 43 %AC of 5.7. The Contractor had two days between the two Form 43’s to question the mix design.

The Contractor said the %AC change was a Significant Change in the Character of the Work per Spec 1.04.02(c). This spec section also states, *The basis for the adjustment shall be agreed upon prior to the performance of the work.* Since there was no agreement, the change cannot be considered significant.

**Discussions**

The Contractor said that within three days of starting paving a problem was noted. They had meetings with CDOT and then sent the letter on June 7, 2013 expressing their concerns.

The Contractor said CDOT said that the Region 2 mix design form is not a Contract requirement and is not relevant. The Contractor maintains it is relevant because it changed the Contractor’s mix design. Does this mean that each CDOT Region has its own method to develop the Form 43? Why does the mix design need to be stamped by a PE if CDOT is going to change the mix design? CDOT said it used the %AC to control the voids. By not using the correct non-linear graph, the data CDOT used was wrong. Although the second Form 43 was signed by the Contractor and the Project Engineer on May 15, 2013, it was not signed by the Region Materials Engineer until May 23, 2013.

The Contractor said on May 21, 2012 they paved 100 tons for the Check Test program. On May 23, 2013 they did the 500 ton test strip. They had problems and shut the paving down. They also had to shut down for the Memorial Day holiday and were not able to meet with CDOT until the meeting in Pueblo on June 3, 2103.

The Contractor said they have developed targets for various HMA mixes which is what they use at bid time. The formal mix design is then prepared after the bid to comply with the specs. The Contractor has a great amount of experience in using its mix designs.

The Contractor asked why CDOT set a range for voids and not for %AC. The design mix %AC was for the optimum and said that by CDOT setting the voids determines the %AC.

CDOT said that averages have no place for the Project and that the **%AC is a risk to the contractors**.

**Questions by the DRB**

1. To Both: Who is responsible professionally for the HMA mix design?

 Both said it was the Contractor’s engineer.

 To Both: Who is responsible to insure the HMA meets spec requirements in the field?

 Both said it was the contractor.

2. To Both: Walk through the use of CP 52 and Form 43.

 Both went through the process.

3. To the Contractor: When was the Region 2 mix design form requested? Supplied?

 The Contractor did not know the form existed until both parties started discussions. The Resident Engineer gave the Contractor the form in December 2013 after the paving was done. The Contractor questioned how CDOT justifies the form and change when it is not in the Contract.

4. To CDOT: Why is the Form 429 required if CDOT says it does not use it?

 CDOT said the form is required so they have a standard way of getting the information into their system.

5. To CDOT: Is the Contractor’s position that the non-linear graph is more accurate than the linear graph used by CDOT?

 CDOT said the Contractor’s position is correct; however, that would not have changed the %AC that CDOT used. There was no %AC specified.

6. To Both: Does the Contractor’s June 7, 2013 letter follow the requirements of CP 52 and Form 43?

 CDOT said Form 43 addresses when an issue can be raised. Spec 4.01.02(a)(3) covers how the Form 43 is developed and used.

**Dispute #2- Voids are Unachievable**

**Contractor Presentation on Voids are Unachievable**

The Air Voids were discussed in Dispute #1. The problem is that CDOT by not using the non-linear graph and using the CDOT Region 2 form selected the wrong %AV. Also, the Region 2 Materials Engineer uses lower %AV than others in the area. The last 0.012 correction runs the voids ½% lower than others. The target that CDOT established was incorrect by ½%. This error compounds the problems with the test results. This is shown in the Voids Plot on CDOT Pre-hearing Submittal, Tab 2, Page 2-3 where results below the red line are out of spec. The chart shows how good the HMA was even with the CDOT design changes. Even the CDOT HQ difference is out of spec with the CDOT changes. Example 7 in the Contractor’s Pre-hearing Submittal, Tab 2 shows that dust was replaced with asphalt and how the CDOT HQ lab results differed from Region 2’s test results.

The results were out of the target tolerances but they had to pave because of possible liquidated damages.

The industry adjusts voids by adjusting baghouse fines. The Contractor’s mix design showed a Dust to Asphalt Ratio of 1.16 but the CDOT design change resulted in a 0.62 ratio.

**CDOT Presentation on Voids are Unachievable**

The issues are the curves and the bulk correction factor. CDOT drew a straight line through the data points which it used for Form 43. The graph (non-linear) on Page 2-2 of CDOT Pre-hearing Submittal, Tab 2 is a plot using the Contractor’s Form 429 mix design. CDOT bumped up the %AC by 0.2 from the Contractor’s mix design. The change was based on a White Paper to adjust lab design vs. field production. In establishing Form 43, CDOT doesn’t want the fines to decrease. The %AC is to get the contractor to control the field mix to the targets. The chart on Page 2-3 of CDOT Pre-hearing Submittal, Tab 2 shows the Contractor was having problems following Form 43 and its control at the plant. The Air Voids graph included in the Contractor’s mix design is not usable because of the small scale. CDOT used the table on Page 4 of the Contractor’s mix design for the data points and drew a straight line for the graph which CDOT used for the Form 43.

The bulk correction factor is used to account for differences in lab equipment and is covered in Spec 106.05(h). The process was established by a CDOT/Industry Task Force in 2000. The initial bulk correction factor based on the first Project Check Test was +0.026. A subsequent Check Test resulted in a bulk correction factor of +0.028 which verifies the earlier factor. The Contractor used the same testing equipment on the CDOT Region 1 SH 9 project near Hartsel, CO in 2012 where the factor was +0.03.

**Contractor Rebuttal**

The Contractor questioned CDOT’s use of the linear graph. CDOT used the straight line graph for the Form 43 rather than the information on the Contractor’s Form 429 mix design. If CDOT would have used the graph on CDOT Pre-hearing Submittal, Tab 2, Page 2-2 that was generated from the Form 429, the voids would have been 3.0 % for a %AC of 5.7 rather than the 3.3 that was used on the Form 43.

In order to meet the lower voids, the Contractor had to reject dust. They brought this up in the beginning and wrote a letter. The industry agreed to up the %AC if the voids could be met but did not agree to changes in the mix design. The spec allows CDOT to change the voids but not the asphalt. The Contractor would not have had a problem early on if the original mix design had been used. The final %AC for the job averaged 5.68.

The Contractor did everything required in CP 52 and the specs. The targets were not achievable because CDOT used the wrong graph to get %AV (3.3 vs. 3.0). Based on the aggregate, %AC and %AV the only way to meet the CDOT changed mix design was to mechanically change the %AV by rejecting dust. The Contractor’s gradation tests were very close to the CDOT Central Lab.

**CDOT Rebuttal**

The form 429 was not used to make the asphalt adjustment. CDOT is not required to do check testing. The QA for the Project is the Region 2 lab. The bulk correction factor is testing machine and mix specific as shown in CDOT Pre-hearing Submittal, Tab R2G for the SH 9 project.

Dust and asphalt are in the specs. If the Contractor successfully produced 1.6 million tons of HMA last year, why couldn’t it control the mix on this Project?

**Note:** There were no questions by the DRB

**Dispute #3 - Rejection of Baghouse Fines**

**Contractor Presentation on Rejection of Baghouse Fines**

The Contractor said the issue centers around the targets, correction factor and CDOT’s rounding up. In order to meet %AV it had to reduce the baghouse fines which are normally put back into the mix. They had to do this manually by adjusting a ball valve and dumped 1,002 tons of dust on the ground which then had to be disposed of. Part of the dust was lime which had to be replaced in the mix.

**CDOT Presentation on Rejection of Baghouse Fines**

CDOT said other contractors can make adjustments to reject dust. This is common with the dry pits on the Eastern Plains. The Contractor said they had not needed to reject dust before but this is wrong as the Contractor has done it on many former jobs.

If the Contractor was aware that asphalt was usually added by CDOT, they should have considered the baghouse fines issue in their bid. This is a quality problem for the mix design to meet the specs.

**Discussions**

The Contractor said the aggregates met the specs for SX fines. Their mix design gradation shows 6.7% passing the #200 which is in the control point range of 2.0 to 10.0. The Form 43 % Passing the #200 showed a range of 4.70 to 8.70. The field tests showed the % passing the #200 met the specs.

CDOT referred to the Contractor’s Pre-hearing Submittal, Tab 2, Example 7, which shows some tests with % passing the #200 less than 4.7 in Region 2, CDOT Central Lab and WesTest results. CDOT did not reject the baghouse fines but rather the Contractor did to meet the voids requirement.

The Contractor said that with the design mix of 5.5 %AC and %AV of 3.7 there were more voids. The Project was awarded the smoothest HMA paving award for 2013.

The DRB asked if there was a cut-off date for requesting a new Form 43. CDOT responded that the Contractor can raise the issue at any time, but it would have been nice if it had been done beforehand.

**Dispute #4 - Delays and Financial Impacts Due to CDOT Alteration (Dispute #1)**

**Contractor Presentation on Delays and Financial Impacts Due to CDOT Alteration**

The Contractor said a Professional Engineer designed their mix and then CDOT changed the design. They tried to run the CDOT designed mix but without success. They had to modify their hot mix plant so they could make adjustments to get the CDOT mix design to pass. This delayed the whole Project.

**CDOT Presentation on Delays and Financial Impacts Due to CDOT Alteration**

CDOT did not change the Contractor’s mix design. The Contractor mutually agreed to the plant mix design on the Form 43 which sets the mix parameters. The Contractor signed Form 43.

The Contractor had production issues in getting started.

Spec 403.05 states, *…all other work necessary to complete each hot mix asphalt item will not be paid for separately, but shall be included in the unit price bid.*

The Project was completed in the Contract time.

**Contractor Rebuttal**

The Contractor said it didn’t know the point of CDOT’s statement that the Project was done in the Contract time. If they would not have been delayed due to the design change, they would not have used all the Contract time. They would have been done early so there is no validity to CDOT’s position.

**CDOT Rebuttal**

Added equipment or changes to equipment to meet Form 43 is included in the price of the work.

The Contractor is the one to control the plant and the mix. The QC of the hot mix is the responsibility of the Contractor. The chart on CDOT Pre-hearing Submittal, Tab 2, Page 2-3 shows that with mix adjustment the targets could be met.

**Questions by the DRB**

1. To the Contractor: Did the Contractor submit a schedule revision for the delay as required by Spec 108.08(d)(4)?

 The Contractor said it did not submit a Critical Path Schedule showing the delay. It did send a letter to CDOT on June 21, 2013 on the delay.

**Dispute #5 - Failing Lottman Tests**

**Contractor Presentation on Failing Lottman Tests**

At the beginning of the Project there were failing Lottman tests. By rejecting baghouse fines, some lime was rejected. The rejected lime affected the Lottman tests. They had to dump lime on the ground with the baghouse fines. They can meter in more lime but don’t know the affect for sure on the Lottman tests.

The CDOT design change and rejection of fines caused the Contractor to loose lime. This compromised the lime in the mix

They had to pump more lime into the mix. CDOT will say this was due to lack of moisture and does not affect the Lottman test. The lime problem correlates directly with the fines problem.

**CDOT Presentation on Failing Lottman Tests**

CDOT referred to Spec 401.14 concerning dry lime added to wet aggregate. The lime loss was due to the aggregate not being wet enough for the lime to stick to the aggregate. The chart and table on CDOT Pre-hearing Submittal, Tab 5, Page 5-2 shows that where the moisture was low the Lottman tests failed.

CDOT sent a letter to the Contractor concerning the seasonal precipitation in the area. The Contractor increased the moisture and the tests passed. The failing tests were the result of poor product control.

**Contractor Rebuttal**

The chart referred to by CDOT is for lime while the table is for moisture. The table shows that a low moisture test of 2.5 vs. a minimum moisture content of 3.2% passed the Lottman with a 71 and a test with a minimum moisture of 3.2% failed the Lottman at 69.

The Contractor took buckets of the aggregate for the CDOT tester which might have set in the open until the tester picked them up. They should have been thrown out and the tester should have taken the samples and sealed the container.

The Tensile Strength Ratio (TSR) (Lottman Test) is a function of lime and not moisture. The table moisture variations should not produce the TSR variations that are shown. They run a lot of moisture tests and TSR’s. The Contractor’s design would have achieved the required TSR’s. Aggregate absorption for some aggregates can affect the moisture but not the aggregate that they used on this Project.

**CDOT Rebuttal**

The QA samples for CDOT were pulled by the Contractor. CDOT had no way of knowing how or when the samples were pulled.

The TSR is 70 for lab design but changes to 80 for the field product. When the moisture exceeded 3.2%, the TSR’s passed. The moisture on the aggregate is the key issue.

All hot mix plants have baghouses for air quality control. The lime will always come off unless it is stuck to the aggregate. More moisture results in more lime sticking.

**Discussions**

The Contractor said the table on Contractor Pre-hearing Submittal, Tab 5, shows that as the Contractor increased the lime, the Lottman tests passed.

CDOT said the more moisture there was the better the TSR tests. Also, in the baghouse all dry particles are treated the same if not stuck to the aggregate.

The Contractor said it had no way of knowing how much lime was coming off. As more lime was added to help, there was more lime coming off.

CDOT said the Contractor never provided documentation on how much more lime was added.

**Questions by the DRB**

1. To the Contractor: Explain how the baghouse fines were controlled.

 The Contractor drew a diagram of the hot mix plant showing the baghouse and the control valve on the recirculation line for the baghouse fines.

 The Contractor said CDOT’s spec was a HMA Voids spec and not a HMA aggregate spec. Spec Table 403-1 gives the Dust to Asphalt ratio range and the mix was near the top of the range.

2. To Both: At what point in the production were the failed Lottman tests?

 CDOT said in the first 12,000 tons.

**Dispute #6 - AT-1 Disincentive & AT-1 Passing French Rut Results**

**Contractor Presentation on AT-1 Disincentive & AT-1 Passing French Rut Results**

Test AT-1for Void Results was at the beginning of the Project. The HMA that was placed used the CDOT design and targets.

The table on Contractor Pre-hearing Submittal, Tab 6, shows the AT-1 results for the HMA placed on May 21, 2013. The first test result from CDOT was 0.6 Air Void while the WesTest (Contractor’s tester) result was 2.3 without the correction and 1.2 with the correction. On May 31, 2013, ten days after CDOT provided the first test result, CDOT revised the result to 1.1. CDOT also updated the Rice Value from 2.416 to 2.430. The Contractor said the Rice Value should not have changed.

When CDOT reran the test, they should have used the original HMA puck material and not a new puck. CDOT said the original puck material had been tossed.

CDOT first directed the removal and replacement of the HMA on May 22 due to the VMA being out by more than 2V. Then on May 31 CDOT directed the removal and replacement of the HMA due to the Pay Factor being less than 0.75. This was a concern for the Contractor and they shut the operation down. At a meeting in Pueblo on June 3, 2013, the Contractor requested that the test be rerun per CP 17. On June 19, 2013, the Contractor requested a meeting with CDOT.

On June 19, 2013, CDOT offered to run the French Rut test. The Contractor did not approve of the destructive Rut test and again requested the CDOT Central Lab do the testing.

The puck being tossed, the changing test results from the Region 2 lab, and three different reasons why the HMA should be removed and replaced, shows the chaotic environment the Contractor was working under.

**CDOT Presentation on AT-1 Disincentive & AT-1 Passing French Rut Results**

CDOT said the table on CDOT Pre-hearing Submittal, Tab 6, Page 6-1 shows why the HMA should have been removed and replaced. The French Rut test that CDOT offered passed. Test AT-1 was for the bottom mat of HMA. For the HMA to remain in place based on the Rut test, the maximum Pay Factor was 0.75.

When WesTest got a 2.3 result, the bulk correction factor had not been determined. The AT-1 test results showed a big difference in asphalt content. The first test missed the RAP. Both CDOT and WesTest did retests and the correction factor was determined. The first AT-1 test on May 21, 2013 used the wrong correction factor. CDOT cannot explain the Rice Value change. They did not keep the first test HMA material.

Concerning the CP 17 dispute testing, the test result difference must be equal to or greater than 0.7% for air voids. (The DRB requested a copy of CP 17 since it was not included in either Pre-hearing Submittal. The copy was provided.) The sample tested on May 15, 2013 did not show appreciable differences between labs.

CDOT did not understand the Contractor’s comment that three different reasons were given by CDOT for the removal of the HMA. CDOT directed removal and replacement the first time for the VMA out more than 2V and the second time for the Pay Factor being less than 0.75.

**Contractor Rebuttal**

The Contractor said this is a very technical issue. The initial paving was to try to make the CDOT mix design work. Tests can’t be replicated when the HMA material was destroyed. Two test machines got different results. They requested the process for testing per the instructions for Form 43.

They had to comply with the Form 43 and make the HMA work. The CP 17 testing should have been done due to the CDOT Region 2 testing problems and the CDOT change to the design mix.

**CDOT Rebuttal**

The Contractor did request the use of CP 17 but the difference in the test results for air voids was less than the 0.7 that CP 17 calls for. If CDOT allowed the CP 17 difference to be disregarded, there would be disputes on a daily basis. If this is a problem, the asphalt industry should look into a task force to review it.

CDOT did not have to do the French Rut test. The average of the two test results passed but the HMA could be left in-place with a Pay Factor of 0.75. The spec calls for anything less than 0.75 to be removed and replaced.

CDOT did not alter the Contractor’s mix design on the Form 43. The mix design was agreed on and the Contractor signed the Form 43.

**Questions by the DRB**

1. To CDOT: Why wasn’t CP 17 used if CDOT offered the alternate Rut test?

 CP 17 says the test difference for air voids must be 0.7 and the actual test result difference was 0.6.

2. To Both: Were Contract procedures followed?

 The Contractor said they look at the procedures all the time. Check tests are performed on the HMA and they continue to look at the equipment and the materials. The RAP was looked at two different times using RAP produced on the Project. WesTest noted little change between the tests but there was a big change in the CDOT results.

 CDOT said they could not explain the Rice Value change. The Rice was heavier than the mix design showed.

3. To Both: Explain how the French Rut test and air voids are related.

 CDOT said the Rut test results correlate to low voids. Later void tests were OK.

 The Contractor said the Rut test was not in the specs but the CP 17 test was. The test in CP 17 is much faster than the Rut test. CDOT’s alternates were the Rut test or remove and replace the HMA. They used their Fillmore lab in Colorado Springs for testing. They had the check testing run by their labs in La Junta, Denver and Fillmore. The plant was adjusted based on the bulk correction.

 The Contractor said they had faith in their test equipment and cannot understand the bulk correction factor difference. If CP 17 had been used, we would not be having these discussions today. The CDOT Rut test was outside the Contract. They cannot understand the Rice Value difference that CDOT got.

 CDOT said the rest of the tests on the Project with the correction applied correlated. The design QA was done by Region 2 in Pueblo. CDOT said the FHWA approves the way CDOT tests and the CDOT testing equipment. CDOT has a statewide program to insure that the labs and equipment are giving correct results.

**Dispute #7 - Partnership Refund**

**Contractor Presentation on Partnership Refund**

The Contractor made several requests to CDOT during the Project which were ignored or denied and some that were not even acknowledged. In meetings, CDOT took the position that “We are right and you are wrong. Our results are the only ones that matter.”

In the beginning of the Project the Contractor was told by CDOT there was potential for some relief patching. Although the Contractor’s superintendent asked CDOT on several occasions if the patching was going to be needed, the Project Engineer always said he didn’t know and would get back to them. By the time Region 2 Materials decided to patch, the Contractor had to stop mainline paving in order to begin patching.

Colorado Asphalt Pavement Association (CAPA) members were concerned with what was happening in Region 2 and met with Region 2 staff and even the RTD. Nothing ever changed on the Project. The Contractor had requested CDOT HQ 10K results several times and Region 2 denied every request even though the information is public information. The Contractor asked CDOT personnel not related to this Project for the results and the information was provided very timely and without complication.

The Contractor requested the DRB completely understand the impossible situation that was created on the Project. There was no partnering and the Contractor would like its share of the partnering session costs.

**CDOT Presentation on Partnership Refund**

CDOT said the only Contractor person to attend the Partnering Session was the Superintendent – the same person that signed the Form 43. CDOT had the Project Engineer, the Resident Engineer, CDOT lab personnel and consultant personnel at the session.

**Discussion**

Was there a resolution ladder for the Project?

Both parties said there was. The Project Engineer said he used it on the project with the Superintendent. The ladder was not used all the way to the top before the dispute process started.

**Contractor Summary on All Disputes**

The Contractor said that it had hoped the resolution of the HMA issues could have been solved before the dispute process was started.

The dispute came about due to unresolved issues related to the alteration of the mix design by CDOT and questionable interpretation of the specs and testing.

**CDOT Summary on All Disputes**

The Contractor’s position that CDOT changed the Contractors mix design is wrong. CDOT did not change the mix design. CDOT asked for a mix design that met Contract requirements. The lab design can change in production and CDOT bumped up the asphalt to make sure the field produced mix would fit the targets.

The lab mix was done in a controlled environment and the %AC optimum chosen from the graph. The lab mix can’t be replicated in the field and so the Form 43 mix is made to hit construction targets. The optimum %AC does not work in construction so CDOT set a new %AC which produces the mix shown on Form 43. For the last ten years, CDOT has tracked the %AC, Voids and VMA like is shown in CDOT Pre-hearing Submittal, Tab R1C and has bumped the %AC 0.1 to 0.3 because they have found the %AC adjustments work better that the optimum %AC. Why did the Superintendent sign the Form 43? There was no gun to his head.

In the last ten years, CDOT has had contractorsplace over 10 million tons of HMA and has required a Professional Engineer’s stamp on the design mix. The PE establishes the relationships of the materials and then you need to go from design to construction but adjustments are needed. The process has worked well. If there is a problem with the process, the asphalt industry needs to address it. The Contractor’s design was not changed. CDOT picked a point with on the graph with voids in consideration.

On dispute #2, the Contractor achieved spec results later on in the Project for the HMA which shows the %AV were achievable. The %AV on the linear graph vs. the non-linear graph varies but CDOT chose a 3.3% voids. It is the Contractor’s responsibility on how to meet the specs in the field. The correction must be applied to the tests. The %AV was low but even near a 5.7 %AC the voids were not met.

On Dispute #3, in order to get the correct volumetrics, the baghouse fines needed to be rejected. CDOT said it was common to have to reject baghouse fines. The Contractor rejected baghouse fines on its SH 9 project. (The Contractor said they did not reject baghouse fines on the SH 9 job.) At almost any %AC, the baghouse fines would need rejection to meet the specs.

On Dispute #5, when the moisture was correct, the Lottman tests passed. The first 12,000 tons of HMA had low moisture and the Lottman tests failed. On test AT-1, CDOT went above and beyond what they usually do by doing the French Rut test to allow the material to remain in place.

CDOT said they did receive the Contractor’s June 7, 2013 letter. The Form 43 testing request from the Contractor was written on the bottom of a CDOT Speed Memo. CDOT focused on the condition RED and not the Form 43 request. Three tests were accepted with %AC’s of 5.99, 5.85 and 5.15. Not addressing the Contractor’s comment on the Speed Memo was an oversight by CDOT. The Contractor should have sent a letter on the matter.

**Dispute #1 – CDOT Alteration of the HMA Mix Design submitted by the Contractor**

**Findings**

1. The Contractor submitted an HMA mix design that complied with the requirements of Spec 401.02 and Project Special Provision 403.02, Table 403-1 and 403-2.

 Spec 401.02(a) states:

 *When Laboratory tests indicate that a proposed job-mix formula complies with* ***specifications as revised for the project*** (emphasis added), *a Form 43 shall be executed between the Engineer and the Contractor to establish the job-mix formula.*

2. During the hearing, CDOT confirmed that it was the **Contractor’s Professional Engineer** who was professionally responsible for the HMA mix design and the **Contractor** who wasresponsible to insure the HMA meets spec requirements in the field. Accordingly, if the Contractor had used its mix design and the HMA failed to comply with the Contract requirements, it would have been the Contractor’s responsibility to accept a Pay Factor adjustment or remove and replace the HMA.

3. Project Special Provision 403.02 states:

 *Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum.*

 This statement does not state that CDOT can change the Asphalt Cement percentage which it did in upping the %AC by 0.2%. If CDOT routinely and unilaterally increases the %AC an average of 0.2% as is shown in CDOT’s Pre-hearing Submittal, Tab 1C and that the **%AC is a risk to the contractors**, such should be stated in the Contract documents rather than insist that by being allowed to decrease the Air Voids up to 1.0% they have the right to increase the %AC. This would also allow a “level playing field” at bid time if all contractors knew CDOT was going to add AC to their proposed mix designs.

 Instructions for CDOT Form No. 43, Authority for This Report states**:**

*Subsection 401.02 of the Standard Specifications authorizes the Engineer to modify in writing the Job-Mix Formula specified in the Contract Special Provisions and, when necessary, to establish a new Job-Mix Formula.*

 Spec 401.02(b) states:

 *The job-mix formula may be changed by the Engineer if the change will produce a mixture of equal or better quality and will: (1) Permit better utilization of available material, or (2) Result in a saving in cost to the Department through an adjustment in unit price.*

 In the case at hand, Item (1) does not apply. As to Item (2), CDOT’s change resulted in an **increase in cost** since the Contractor had to use additional Asphalt Cement.

 CDOT also stated that they bumped up the %AC from what was shown in contractors’ mix designs as listed in their Pre-hearing submittal Tab 1C and had done so for many years. Spec 401.02(b) allows CDOT to change the Job-Mix Formulas if there is a reason for doing so. If the reason is to make the field mix to work better, that is CDOT’s prerogative but it makes a change to what the Contractor bid and a change should be incorporated into the Contract per Specs 104.02 and 109.04.

4. CDOT admitted that the use of the non-linear graph for Voids vs AC Content was more accurate than the straight line graph CDOT used. CDOT’s use of the straight line graph gave Voids at 3.3%. By not using the more accurate graph, there was a further decrease in voids of 10% (3.3 vs. 3.0). This resulted in errors in the target ranges that were set.

5. CDOT Region 2 has developed its own mix design form/methodology. Since this form is not referenced in the Contract or in the Field Materials Manual, it raises question on the acceptance of the outcome(s) from its use. The refusal by CDOT to provide the form until the HMA paving was done, also brings into question the contractual acceptance of its use. Also, by not using the Contractor’s Form 429 information in developing the adjusted mix design, seems to negate the whole purpose of a contractor submitting a mix design rather than just the components of the mix for CDOT’s development of a mix design.

6. CP 52-13: Contractor Asphalt Mix Design Approval Procedures, Section 3: Approval of Mix Designs, covers what is required in the mix design submittal, aggregate testing by the CDOT Central Lab, and what happens if there is a difference between the Contractor’s aggregate tests and those of the Central Lab. Nothing was presented at the hearing that showed there was a problem in the aggregate testing by the Central Lab. Section 3.4 states:

 ***If all tests conform to the specifications***(emphasis added)*, a CDOT Form #43 (Job Mix Formula) will be executed.*

Since nothing was presented by CDOT in its Pre-hearing Submittal or at the hearing that indicated that the tests did not meet the specifications, the Contractor’s mix design and its components must have conformed to the specifications. Spec 401.02(a)(3) contains the same provision.

Section 3.5 states:

 *All mix design properties must satisfy Table 403-1 from the Project Special Provisions. The CDOT FORM#43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0% below the mix design optimum.*

The Contractor’s mix design complied with the parameters of Table 403-1.

 Section 3.2 states:

 *The Engineer may reject a mix design that appears to have errors.*

 Since nothing was presented by CDOT in its Pre-hearing Submittal or at the hearing that indicated that there were any errors in the Contractor’s mix design, there was no basis for the Engineer to reject the Contractor’s mix design. In addition, there is nothing in CP 52 that states CDOT can change the Contractor’s mix design, including changes to the %AC.

7. CP 52-13, Section 5.1 states:

 *If a contractor wishes to check a test result with CDOT, they should make arrangements with the Flexible Pavement Unit or Physical Properties Unit of the CDOT Staff Materials Laboratory, depending on the properties (mix or aggregate) that are to be tested. The unit will work* ***one-on-one with the******contractor*** (emphasis added), as time permits to improve the inter-lab agreement.

Based on this section, it is difficult to understand why Region 2 Materials refused to comply with the Contractor’s requests for Central Lab 10 K test results and did not follow through on the Contractor’s Form 43 additional testing.

8. CDOT’s Position Paper, Summary Dispute 1 states:

 *Once CDOT and the Contractor sign this form, the Form 43 becomes the contract, similar to when CDOT and the Contractor sign a change order, the change order becomes contract.*

By signing the Form 43, the Contractor acknowledged a change in the job mix for the HMA but did not indicate that the change was at **no cost.** Based on Findings 1 through 7 above,CDOT changed the Contractor’s mix design that met the specification requirements.

 Since CDOT, prior to the bid, did not elect to pay for the Asphalt Cement as a pay item, the asphalt cement was to be included in the Unit Price for the HMA. Spec 104.02 states:

 *The Engineer reserves the right to make, in writing* (Form 43), *at any time during the work, such changes in quantities and such alterations in the work as are necessary* *to satisfactorily complete the project. … If the alterations or changes in quantities do not significantly change the character of the work to be performed under the Contract,* ***the altered work will be paid for*** (emphasis added) *as provided elsewhere in the Contract* (Spec 109.04)*.*

 The Contractor submitted to CDOT a Change Order Request for the Alteration of Its Mix Design on June 21, 2013 referencing Specs 104.02(c) and 109.04.

 Spec 101.19 – Contract Modification Order, states:

 …*The Contract Modification Order* ***is the only method authorized for changing the Contract*** (emphasis added).

9. On the third day of paving on June 6, 2013, a Condition Red was observed in the testing and Speed Memo #7 was sent to the Contractor on June 7, 2013. The Contractor responded with a letter dated June 7, 2013 from its Area Quality Control Manager and also requested to change the Form 43 in the Remarks Section of the Speed Memo. The third paragraph of the June 7, 2013 letter states:

 *We also like to re-evaluate* *the target AC content on the Form 43 and request the target be lowered to 5.5%. We believe the target of 5.7% for a 100 gyration mix is too high. With the data we have to date; we will need to run the AC Contents at the lower end of the tolerance for the entire project just to achieve the desired air voids. When the run the risk of being out of spec, on the low end, for the AC element throughout the entire project.*

 The CDOT June 6(?), 2013 letter from the CDOT Project Engineer, which was transmitted by email to the Contractor on June 7, 2013 states:

 *I am in receipt of your Letter of Response to the CDOT Form 105-7 which was issued on June 6, 2013. Your submitted plan (as attached)* ***is deemed acceptable***(emphasis added) *and this letter authorizes Martin Marietta Materials to continue asphalt production and paving for the above referenced project.*

During the hearing, CDOT said it had overlooked the Contractor’s request to change the Form 43. Had this request been addressed by CDOT per the Instructions for CDOT Form No. 43, the AC content could have been reviewed and changed by the Engineer to establish a new job-mix formula. Under Method of Preparation of the Instructions, it appears it is CDOT’s responsibility to obtain the required samples and transmit them along with other required data to the CDOT Central Lab using CDOT Form 157. Method of Preparation Item (d) states:

 *Upon completion of the mix design, the* ***Central Laboratory***(emphasis added) *will prepare the Job Mix Formula and make normal distribution.*

Method of Preparation Items (e) and (f) further address the responsibilities of the Project Engineer and the involvement of the Central Lab. Had CDOT followed through with the Contractor’s request to revise the AC content and involved the Central Lab, the HMA mix issue could have been addressed before much paving was completed. This would also have resulted in correct targets being set for Voids which continued to be a problem as reflected in CDOT’s Air Void Reports which were included in the Contractor’s Pre-hearing Submittal Tab 2.

**Recommendations**

1. CDOT, in conjunction with the asphalt industry if necessary, review how CDOT can reject/change the contractor’s mix design as prepared by a Professional Engineer and that complies with the Contract specifications and still hold the Contractor responsible for meeting the specification requirements in the field with an HMA mix design that has been altered by CDOT. If CDOT wants to add asphalt as a standard practice as was shown in CDOT’s Pre-hearing Submittal Tab 1a and 1c, the industry should be so notified.

2. Since Region 2 is using a mix design methodology/form for establishing the HMA mix design that is not a CDOT Standard and included by reference in the Contract, CDOT should take steps to insure that its Regions are using a methodology/form that is approved by CDOT Headquarters Materials and is included in any referenced procedures. Furthermore, CDOT should require the use by its Regions of the most accurate plot/graph to determine HMA properties.

3. Based on Findings 1, 2, 3, 5, 6, 7, 8 and 9 and the fact that there are no provisions in Spec 401 and 403 that state the Contractor will not be paid for any changes made by CDOT in the %AC, there is merit in the Contractor’s position on the dispute and the Contractor should be compensated for the additional asphalt cement that was added by CDOT.

 Pay Estimate #6 dated November 12, 2013 under Item 0130 – 403-34881: HMA (Grade SX) shows a quantity of 48,955.90 tons. The “mean” AC% listed on CDOT’s Quality Report dated September 3, 2013 is 5.682 which is 0.182% more that the %AC in the Contractor’s mix design. Accordingly, CDOT should pay the Contractor for an additional 89.10 tons (48,955.90 X 0.00182). The AC ton price shall be substantiated by the Contractor by providing invoice(s) for the AC used on the Project. The approximate payment increase is $50,475.15 (89.10 X $566.50).

**Dispute #2- Voids are Unachievable**

**Findings**

1. As was discussed in Finding 4 for Dispute #1, CDOT admitted that the use of the linear graph was not as accurate as if the non-linear graph was used. The use of the linear graph by CDOT resulted in an Air Void % of 3.3 while the non-linear graph shows it the correct %AV is 3.0.

2. A was discussed in Finding 7 of Dispute #1 and understanding that the Contractor had problems with the Region 2 test results, it is difficult to understand why CDOT did not involve the CDOT Central Lab early on.

3. By manually manipulating the baghouse fines at its HMA plant, the Contractor eventually achieved the HMA quality targets but with Pay Factor reductions. A review of the Quality of HBP results which was included in the Contractor’s Pre-hearing Submittal, Tab 2, most MQL results for %AC and VMA were high, but the MQL for the Air Voids varied greatly and were usually substantially lower than the MQL for %AC and VMA.

 Based on the information in the Pre-hearing submittals and the hearing presentations, the DRB has no way of interpreting how the difference in Air Voids (3.0 vs. 3.3) might have affected the HMA targets and the MQL results.

**Recommendations**

1. There is no merit in the Contractor’s position that the voids were unachievable since it eventually produced HMA that fell within the target ranges. The Contractor’s request for $55,473.98 is denied.

2. All HMA property tests that resulted in a Pay Factor less than 1.0 should be reevaluated by CDOT in conjunction with the Contractor using new targets based on the non-linear graph. Any changes in Pay Factor should be corrected and the appropriate disincentive payment adjusted.

**Dispute #3 - Rejection of Baghouse Fines**

**Findings**

1. Revised Spec 401.02(a) addresses the rejection of baghouse fines so it is an item that should have been considered at bid time and during the preparation of the design mix. Revised Spec 401.02(a)(1) states:

 *All costs associated with theoretical rejection of baghouse fines mix design, production, and acceptance shall be at the Contractor’s expense.*

Revised Spec 401.02(a)(2) states:

 *The Contractor shall submit a separate quality Control (QC) plan for handling the rejection of baghouse fines.*

**Recommendation**

1. The Contractor’s request for additional compensation of $90,597.68 for the rejection of baghouse fines is without merit and is therefore denied.

**Dispute #4 - Delays and Financial Impacts Due to CDOT Alteration (Dispute #1)**

**Findings**

1. Spec 108.08(d)(4) states:

  *A schedule revision as defined in subsection 108.03 shall accompany the* (delay) *request. The Schedule as revised shall clearly indicate that the activity or activities delayed were critical or have become critical due to the delay. For the purpose of these specifications, an activity shall be considered critical if all previously available float time has been used, and this delay will directly delay the Contract Completion Date.*

During the hearing, the Contractor stated it did not submit a schedule revision as required by the specifications.

2. The Project was completed within the Contract time.

**Recommendation**

1. The Contractor’s request for additional compensation of $36,920.38 for delay and financial impact due to the CDOT alteration of the mix design is without merit and is therefore denied.

**Dispute #5 - Failing Lottman Tests**

**Findings:**

1. The Contractor’s position that the failed Lottman Tests were the result of the loss of lime due to the rejection of baghouse fines is not supported by later passing Lottman Results where baghouse fines were still being rejected.

2. Once the Contractor began achieving the required aggregate moisture, the Lottman Tests passed and were considerably above the minimum TSR of 70.

**Recommendation**

1. The Contractor’s request for additional compensation of $56,560.00 for the failing Lottman tests is without merit and is therefore denied.

**Dispute #6 - AT-1 Disincentive & AT-1 Passing French Rut Results**

**Findings**

1. The first test results for AT-1 were changed by CDOT for Voids from 0.6 to 1.1 and Rice Value from 2.416 to 2.430. During the hearing, CDOT admitted they could not explain the change in the Rice Value. CDOT directed the removal and replacement of the HMA for different reasons from the first to the second test. In addition, CDOT used different HMA pucks for the two tests because the first puck was tossed.

2. CDOT refused to employ the additional testing requested by the Contractor under CP-17 because the test differences were out by 0.6% rather than the 0.7% in CP-17. CDOT also acknowledged that it failed to comply with the Contractor’s request for additional Form 43 testing which was written on the bottom of the Speed Memo on June 7, 2013.

 The Contractor had questioned the accuracy of the Region 2 test results on several occasions. Based on this questioning, the tests result changes and different pucks as discussed in Finding 1, and the altered mixed design by CDOT, the Contractor’s request for the employment of CP-17 was more than reasonable and should not have been disregarded for a minor deviation (0.6 vs. 0.7).

3. Similar to Dispute #2, Finding 3, the DRB has no way of interpreting how the difference in Air Voids (3.0 vs. 3.3) might have affected the AT-1 test results.

4. CDOT proposed the French Rut Test for acceptance based on a maximum Pay Factor of 0.75. CDOT accepted the Rut Tests as passing. The French Rut Test (Colorado Procedure – Laboratory 5114-10) addresses how the test is to be performed but makes no mention of acceptance standards. CDOT did not indicate how the Test and the results are a part of the Contract but CP-17 is part of the Contract and was requested by the Contractor.

**Recommendations**

1. Based on Findings 1, 2 and 3, all HMA property tests that resulted in a Pay Factor less than 1.0 should be reevaluated by CDOT in conjunction with the Contractor using new targets based on the non-linear graph.

2. Based on finding 3, since the French Rut passed, it appears the HMA will perform over time thus demonstrating the HMA meets the Contract requirements regardless of the test results. Accordingly, there is merit in the Contractor’s position and the Pay Factor for the HMA covered by test AT-1 should be adjusted to 1.0.

**Dispute #7 - Partnership Refund**

**Findings**

1. For Partnering to work, both sides must be committed to the process and always attempt to understand the other party’s position.

2. The lack of attendance at the partnering session by key Contractor personnel brings into question the Contractor’s commitment.

3. Disregarding the Contractor’s questioning on the Form 43 mix design, continuing to insist that the CDOT results were the only correct ones, failing to implement the Form 43 additional testing request, and rejecting the Contractor’s request to use CP-17 after CDOT got two different tests results without explanation, CDOT also did not seem committed to the partnering process.

**Recommendation**

1. Since the Contractor agreed to the use of Partnering on the Project, regardless of the outcomes during the Project, there is no merit in the Contractor’s request to pay its share of the Partnering costs of $1,400.00 and the Contractor’s request is therefore denied.

Respectfully submitted, this 3rd day of June 2014.



 W. H. Hinton II

**NOTE: Dissenting Findings and Recommendations follow.**

**DISPUTE REVIEW BOARD REPORTAND RECOMMENDATION**

 **US 50 La Junta East – 4 Lane**

 **OTERO COUNTY, CO**

 **CDOT PROJECT NO. NH 0505-047**

**DISPUTE CONCERNING ALTERATION OF HMA MIX DESIGN AND RELATED ISSUES**

**DRB Member Stanley B Williams**

This Dissenting DRB member disagrees with the findings of the two majority DRB members on MMM’s Dispute # 1, and their interpretation of the use and applicability of Form 43 in defining the asphalt mix design for a CDOT project. This Dissenting DRB member bases his position on the following provisions of the CDOT Standard Specifications for Road and Bridge Construction:

1. Standard Specification Section 401.02(a) states: “*Mix Design*. The Contractor shall submit the following to the Engineer: (1) **A proposed** hot mix asphalt mix design prepared in accordance with Colorado Procedure 52 …….. The Contractor’s **proposed** job-mix formula for each hot mix asphalt grading will be tested by the Department ….”
2. Standard Specification Section 401.02(a) also states: “When Laboratory tests indicate that **a** **proposed** job-mix formula complies with the specifications as revised for the project, a Form 43 shall be executed between the Engineer and the Contractor to establish **the job-mix formula**.”
3. Standard Specification Section 401.02(b) states: “**The job-mix formula** for each mixture shall be in effect unless modified in writing on Form 43.” And,
4. Standard Specification Section 401.02(b) also states: “Requests made in writing by the Contractor for changes in **the job-mix formula** will be considered.”

The Dissenting DRB member maintains that the Contractor, MMM:

1. Submitted its proposed job-mix design to CDOT, which was tested by CDOT Laboratory;
2. Executed (signed) Form 43, establishing the job-mix formula for the project;
3. Thereby, making the mutually-agreed upon job-mix formula in effect for the project; and,
4. MMM did not request a change in the job-mix formula that was considered or exercised by the CDOT Engineer.

The Dissenting DRB has attached a detailed analysis of MMM’s Dispute #1, in which I itemize my dissenting observations and findings versus the majority’s positions regarding MMM’s specific claims and requests.

**SUMMARY OF FINDINGS**

|  |  |
| --- | --- |
| **MMM DISPUTE #** | **MERIT / NO MERIT** |
| Dispute # 1 “CDOT Alteration of MMM Submitted HMA Mix Design” | NO MERIT |
| Dispute # 2 “Voids Are Unachievable” is Related to and Dependent on Dispute # 1: | NO MERIT |
| Dispute # 3 “Everyone Rejects Dust in Region 2” is Related to and Dependent on Dispute # 1 | NO MERIT |
| Dispute # 4 “Delay and Financial Impact due to CDOT Alteration” is Related to and Dependent on Dispute # 1 | NO MERIT |
| Dispute # 5 “Failing Lottman Results” is Related to and Dependent on Dispute # 1 | NO MERIT |
| Dispute # 6 “AT1 Disincentives & AT1 Passing French Rut Results” | On this issue, the Dissenting DRB member defers to the superior knowledge of the other DRB members who are more knowledgeable in the French Rut Tests.MERIT, per the Majority DRB |
| Dispute # 7 “Partnership Refund” | NO MERIT |
|  |  |
|  |  |

**NOTE:** **DRB Member Stanley Williams has dissented in the Findings and Recommendations for Dispute #1 – CDOT Alteration of the HMA Mix Design submitted by the Contractor and the dissent is attached. Agreement by other DRB members with the other Findings and Recommendations stated above are included in the dissenting opinions.**

Respectfully submitted, this Second day of June 2014.

Stanley B Williams

June 2, 2014

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| --- |
| **Dispute #1 – CDOT Alteration of the HMA Mix Design submitted by the Contractor** |
| **Majority DRB Findings** | **Dissenting DRB Findings** |
| 1. The Contractor submitted an HMA mix design that complied with the requirements of Spec 401.02 and Project Special Provision 403.02, Table 403-1 and 403-2. Spec 401.02(a) states: *When Laboratory tests indicate that a proposed job-mix formula complies with* ***specifications as revised for the project*** (emphasis added), *a Form 43 shall be executed between the Engineer and the Contractor to establish the job-mix formula.* | True, as evidenced by the fact that an executed Form 43 followed.Whereas 401.02(a) states that a Form 43 shall be **executed** (i.e., signed by both parties) the Form 43 becomes part of the Contract between the parties, in the same way a signed change order becomes a part of the Contract.  |
| 2. During the hearing, CDOT confirmed that it was the **Contractor’s Professional Engineer** who was professionally responsible for the HMA mix design and the **Contractor** who wasresponsible to insure the HMA meets spec requirements in the field. Accordingly, if the Contractor had used its mix design and the HMA failed to comply with the Contract requirements, it would have been the Contractor’s responsibility to accept a Pay Factor adjustment or remove and replace the HMA. | The first sentence is true, as required by 52-13, 3.2However, as for the ‘what if’ statement, the only way the Contractor’s mix design could have been used is if it was approved by the parties as the target mix design and presented on an executed Form 43; per the procedures. |
| 3. Project Special Provision 403.02 states: *Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0 percent below the mix design optimum.* This statement does not state that CDOT can change the Asphalt Cement percentage which it did in upping the %AC by 0.2%. If CDOT routinely and unilaterally increases the %AC an average of 0.2% as is shown in CDOT’s Pre-hearing Submittal, Tab 1C and that the **%AC is a risk to the contractors**, such should be stated in the Contract documents rather than insist that by being allowed to decrease the Air Voids up to 1.0% they have the right to increase the %AC. This would also allow a “level playing field” at bid time if all contractors knew CDOT was going to add AC to their proposed mix designs. | This specification language in Project Special Provision 403.02 was added in 2002 as a result of an In-Place Voids study. The specification language was developed collaboratively through a joint CDOT/Asphalt Industry Task Force prior to adoption by CDOT. Therefore, whereas CDOT has practiced the procedures since 2002 without ever having a contractor file a claim RE the practice, it is arguable that CDOT can continue the practice on the theory of “prior course of dealings between the parties” until a new Joint Task Force changes the practice and procedure in the future.CDOT personnel stated that they were not aware of any other disputes to date questioning the establishment of production targets on the Form 43, and difference in asphalt cement between the proposed mix design and the Form 43 construction target mix design.  |
|  Instructions for CDOT Form No. 43, Authority for This Report states**:** *Subsection 401.02 of the Standard Specifications authorizes the Engineer to modify in writing the Job-Mix Formula specified in the Contract Special Provisions and, when necessary, to establish a new Job-Mix Formula.*Spec 401.02(b) states: *The job-mix formula may be changed by the Engineer if the change will produce a mixture of equal or better quality and will:* *(1) Permit better utilization of available material, or (2) Result in a saving in cost to the Department through an adjustment in unit price.* In the case at hand, Item (1) does not apply. As to Item (2), CDOT’s change resulted in an **increase in cost** since the Contractor had to use additional Asphalt Cement. | In citing Spec 401.02(b), the majority DRB takes the same first misstep as MMM; quoting only a portion of the cited specification. When taken in its entirety, Section 401.02(b) states:  **“*Should a change in sources of materials be made, a new job-mix formula shall be established before the new material is used.*** *This new job-mix formula shall be in effect until modified by the Engineer. Requests made in writing by the Contractor for changes in the job-mix formula shall be considered.* ***The job-mix formula may be changed by the Engineer if the change will produce a mixture of equal or better quality and will: (1) Permit better utilization of available material, or (2) Result in a saving in cost to the Department through an adjustment in unit price.***As can been seen, this section of the specification is related to changes in the source materials. No change in the source materials was proposed or required by CDOT.Therefore, 401.02(b) is not applicable to the case at hand. Furthermore, as for the alleged increase in the cost of the Asphalt Cement, Section 403.05 addresses the issue: “*Aggregate,* ***asphalt cement****, asphalt recycling agent, additives, hydrated lime, and all other work necessary to complete each hot mix asphalt item* ***will not be paid for separately but shall be included in the unit price bid****.”* |
| 4. CDOT admitted that the use of the non-linear graph for Voids vs AC Content was more accurate than the straight line graph CDOT used. CDOT’s use of the straight line graph gave Voids at 3.3%. By not using the more accurate graph, there was a further decrease in voids of 10% (3.3 vs. 3.0). This resulted in errors in the target ranges that were set.  | Any question about the byproducts of Form 43 (graphs, %AC, % Voids, tests, etc.) are really questions regarding the efficacy of the Form 43 job-mix. If a contractor is not satisfied with the Form 43 mix formula, the contractor can request changes in the job-mix formula per Section 401.02(b): “*Requests made in writing by the contractor for changes in the job-mix formula will be considered.”* MMM did not request and receive consideration for a change in Form 43 per the contract requirements. |
| 5. CDOT Region 2 has developed its own mix design form/methodology. Since this form is not referenced in the Contract or in the Field Materials Manual, it raises question on the acceptance of the outcome(s) from its use. The refusal by CDOT to provide the form until the HMA paving was done, also brings into question the contractual acceptance of its use. Also, by not using the Contractor’s Form 429 information in developing the adjusted mix design, seems to negate the whole purpose of a contractor submitting a mix design rather than just the components of the mix for CDOT’s development of a mix design. | Any question about the byproducts of Form 43 (graphs, %AC, % Voids, tests, etc.) are really questions regarding the efficacy of the Form 43 job-mix. If a contractor is not satisfied with Form 43, the contractor can request changes in the job-mix formula per Section 401.02(b): “*Requests made in writing by the contractor for changes in the job-mix formula will be considered.”* MMM did not request and receive consideration for a change in Form 43 per the contract requirements. |
| 6. CP 52-13: Contractor Asphalt Mix Design Approval Procedures, Section 3: Approval of Mix Designs, covers what is required in the mix design submittal, aggregate testing by the CDOT Central Lab, and what happens if there is a difference between the Contractor’s aggregate tests and those of the Central Lab. Nothing was presented at the hearing that showed there was a problem in the aggregate testing by the Central Lab. Section 3.4 states: ***If all tests conform to the specifications***(emphasis added)*, a CDOT Form #43 (Job Mix Formula) will be executed.*Since nothing was presented by CDOT in its Pre-hearing Submittal or at the hearing that indicated that the tests did not meet the specifications, the Contractor’s mix design and its components must have conformed to the specifications. Spec 401.02(a)(3) contains the same provision.Section 3.5 states: *All mix design properties must satisfy Table 403-1 from the Project Special Provisions. The CDOT FORM#43 will establish construction targets for Asphalt Cement and all mix properties at Air Voids up to 1.0% below the mix design optimum.*The Contractor’s mix design complied with the parameters of Table 403-1.Section 3.2 states: *The Engineer may reject a mix design that appears to have errors.* Since nothing was presented by CDOT in its Pre-hearing Submittal or at the hearing that indicated that there were any errors in the Contractor’s mix design, there was no basis for the Engineer to reject the Contractor’s mix design. In addition, there is nothing in CP 52 that states CDOT can change the Contractor’s mix design, including changes to the %AC. | True statement RE CP 52-13True statement RE CP 52-13 Section 3.4True statementTrue statement RE CP 52-13 Section 3.5An apparently True statement in that a Form 43 followed.True statement regarding the Contractor’s **proposed** mix-design; no relationship to **the mix-design** on Form 43**.**Misstatements of fact: “the Contractor’s mix design” is actually, “the Contractor’s ‘**proposed’** mix design”.The Engineer did not reject or change **the Contractor’s mix design**; there was no such animal. |
| 7. CP 52-13, Section 5.1 states: *If a contractor wishes to check a test result with CDOT, they should make arrangements with the Flexible Pavement Unit or Physical Properties Unit of the CDOT Staff Materials Laboratory, depending on the properties (mix or aggregate) that are to be tested. The unit will work* ***one-on-one with the******contractor*** (emphasis added), as time permits to improve the inter-lab agreement.Based on this section, it is difficult to understand why Region 2 Materials refused to comply with the Contractor’s requests for Central Lab 10 K test results and did not follow through on the Contractor’s Form 43 additional testing. | This Dissenting DRB member is not aware of a MMM request for Central Lab 10 K test result.This Dissenting DRB member does not understand the statement, “.. did not follow through on the Contractor’s Form 43 additional testing.” |
| 8. CDOT’s Position Paper, Summary Dispute 1 states:  *Once CDOT and the Contractor sign this form, the Form 43 becomes the contract, similar to when CDOT and the Contractor sign a change order, the change order becomes contract.*By signing the Form 43, the Contractor acknowledged a change in the job mix for the HMA but did not indicate that the change was at **no cost.** Based on Findings 1 through 7 above,CDOT changed the Contractor’s mix design that met the specification requirements.  Since CDOT, prior to the bid, did not elect to pay for the Asphalt Cement as a pay item, the asphalt cement was to be included in the Unit Price for the HMA.  Spec 104.02 states: *The Engineer reserves the right to make, in writing* (Form 43), *at any time during the work, such changes in quantities and such alterations in the work as are necessary* *to satisfactorily complete the project. … If the alterations or changes in quantities do not significantly change the character of the work to be performed under the Contract,* ***the altered work will be paid for*** (emphasis added) *as provided elsewhere in the Contract* (Spec 109.04)*.* The Contractor submitted to CDOT a Change Order Request for the Alteration of Its Mix Design on June 21, 2013 referencing Specs 104.02(c) and 109.04.Spec 101.19 – Contract Modification Order, states: …*The Contract Modification Order* ***is the only method authorized for changing the Contract*** (emphasis added). | The CDOT statement is true that an executed (signed) Form 43 is a part of the overall project contract.This is a misstatement of fact. “By signing the Form 43, the Contractor acknowledged a change in the job mix..” Not true.In fact, signing the Form 43 creates, generates, defines, originates, etc. **THE job-mix.**  Before Form 43 is signed, the only mix design in existence is the Contractor’s **proposed mix design that, hopefully, complies with the specifications for the project.**This is a misstatement of an irrelevant provision. “Spec 104.02 states: *The Engineer reserves the right to make, in writing* (Form 43), *at any time..”*1. *Spec 104.02(c)* *Significant Changes in the Character of Work,* provides guidance when there are Significant Changes in the Character of Work being performed; which is not the case in this discussion.
2. Furthermore, (Form 43) is nowhere to be found in Spec 104.02(c).

True statement of the contents of Spec. 101.19; however, the relevance to the issue at hand is not apparent or defined. |
| 9. On the third day of paving on June 6, 2013, a Condition Red was observed in the testing and Speed Memo #7 was sent to the Contractor on June 7, 2013. The Contractor responded with a letter dated June 7, 2013 from its Area Quality Control Manager and also requested to change the Form 43 in the Remarks Section of the Speed Memo. The third paragraph of the June 7, 2013 letter states: *We also like to re-evaluate* the target AC content on the Form 43 and request the target be lowered to 5.5%. We believe the target of 5.7% for a 100 gyration mix is too high. With the data we have to date; we will need to run the AC Contents at the lower end of the tolerance for the entire project just to achieve the desired air voids. When the run the risk of being out of spec, on the low end, for the AC element throughout the entire project.The CDOT June 6(?), 2013 letter from the CDOT Project Engineer, which was transmitted by email to the Contractor on June 7, 2013 states: *I am in receipt of your Letter of Response to the CDOT Form 105-7 which was issued on June 6, 2013. Your submitted plan (as attached)* ***is deemed acceptable***(emphasis added) *and this letter authorizes Martin Marietta Materials to continue asphalt production and paving for the above referenced project.*During the hearing, CDOT said it had overlooked the Contractor’s request to change the Form 43. Had this request been addressed by CDOT per the Instructions for CDOT Form No. 43, the AC content could have been reviewed and changed by the Engineer to establish a new job-mix formula. Under Method of Preparation of the Instructions, it appears it is CDOT’s responsibility to obtain the required samples and transmit them along with other required data to the CDOT Central Lab using CDOT Form 157. Method of Preparation Item (d) states:*Upon completion of the mix design, the* ***Central Laboratory***(emphasis added) *will prepare the Job Mix Formula and make normal distribution.*Method of Preparation Items (e) and (f) further address the responsibilities of the Project Engineer and the involvement of the Central Lab. Had CDOT followed through with the Contractor’s request to revise the AC content and involved the Central Lab, the HMA mix issue could have been addressed before much paving was completed. This would also have resulted in correct targets being set for Voids which continued to be a problem as reflected in CDOT’s Air Void Reports which were included in the Contractor’s Pre-hearing Submittal Tab 2. | OKTrue; however, does the verbiage suggest a strong intent or desire on the part of MMM to have the Form 43 job-mix changed?MMM’s cover email to the June 7, 2013 letter says, “Attached is MMM response to the 105 issued to us yesterday evening. I’ve also attached our production report from yesterday as well. Give me a call if you have any questions. Thanks Dave Chelgren”NOTE: There is no direct reference to the Form 43 job-mix.In the CDOT Project Engineer’s June 7 reply, exactly what is the ‘submitted plan’ he is referring to? It’s not clear and not really relevant to the question of whether MMM was requesting a change in the Form 43 job-mix design in their June 7, 2013 letter.CDOT admits that they overlooked MMM’s request to change the Form 43 mix design. MMM, however, is not without blame for not aggressively pursuing their request for a re-evaluation of the target AC content, because they did not follow up the June 7 letter with a repeated request for a change in the Form 43.In fact, on June 21, 2013 (two weeks after June 7, 2013) MMM submitted a Change Order Request requesting $221,603 from CDOT for “changing” MMM’s mix design (sic). So, rather than aggressively requesting a change in the Form 43 job-mix formula as required by the procedure in 401.02(b), MMM pursued a course of posturing for a claim / REA rather than a change in the Form 43. In the meantime, pursuant to 401.02(b), the existing job-mix formula remained in effect because a request to modify the formula in writing was not made by MMM. |
| **Recommendations** | **Recommendations** |
|  | **No Merit !!** |

Stanley B Williams, June 2, 2014