**Guidance for Asphalt Cement Price Index Adjustments**

**What is the purpose of the Asphalt Cement Price Index?**

The Asphalt Cement (AC) price index specification allows bidders to choose to have the price of certain contract items that utilize liquid asphalt cement (AC) to be adjusted up or down relative to the AC market price. A bidder who chooses to accept this price adjustment can then prepare a bid using the current market price without having to project and add an inflationary cost that may or may not be necessary. The AC price can be very volatile and this system shifts the risk to the owner (MoDOT). The price fluctuations go up and down but generally average out as a slight increase over time so MoDOT can save money by absorbing this risk.

**When does an adjustment for the AC index apply and what pay items are adjusted?**

At the time of bid, prospective bidders choose to either accept or decline an adjustment of the price on designated pay items that MoDOT has identified to be significantly affected by the AC market price. If the bidder is awarded the contract, their choice is locked in for the life of that project. Following are the four areas where the bidder can make this choice:

1. **Asphalt Cement** – Accepting the AC Price Index for Asphalt Cement results in the adjustment being applied to the virgin Performance Graded liquid asphalt used in all Section 401, 402, 403 and 413 asphalt mixtures, regardless of the quantity. This includes the hot mix asphalt used in UBAWS, but not the polymer modified membrane, which is a separate choice. Price adjustment spreadsheets are available for [computing the adjustment for hot mix asphalt paid by the tons](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Hot_Mix_Asphalt_Ton.xlsx) and for [computing the adjustment for hot mix asphalt paid by the square yards](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Hot_Mix_Asphalt_SY.xlsx). The adjustment is applied even when the hot mix is designated as Optional Pavement or Alternate Pavement.
2. **Seal Coat** – Accepting the AC Price Index for Seal Coat will result in the adjustment being applied to the pay item for gallons of emulsified asphalt used for Seal Coat (commonly referred to as “Chip Seal”), regardless of the quantity. A price adjustment spreadsheet is available for [computing the adjustment for gallons of Seal Coat](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Seal_Coat.xlsx).
3. **Underseal** – Accepting the AC Price Index for Underseal will result in the adjustment being applied to the gallons of liquid asphalt used in undersealing operations, regardless of the quantity. A price adjustment spreadsheet is available for [computing the adjustment for undersealing](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Undersealing.xlsx). No adjustment is made when high density polyurethane is used for undersealing.
4. **Polymer Modified Emulsion Membrane** – Accepting the AC Price Index for Polymer Modified Emulsion Membrane will result in the adjustment being applied to the theoretical amount of liquid polymer modified emulsion membrane used in conjunction with UBAWS hot mix, regardless of the quantity. A UBAWS price adjustment spreadsheet is available for [computing the adjustment for both the hot mix and polymer modified emulsion membrane](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_UBAWS_Hot_Mix_and_Membrane.xlsx) used in the UBAWS. The spreadsheet requires the user to declare the contractor’s choice for each of the two items and only computes the adjustment on the item(s) that the user indicates were selected at bid. No adjustment is made for polymer modified emulsion membrane used in conjunction with other types of work or hot mixes unless it is specifically stated in the contract.

**How does the price adjustment work?**

A Monthly Asphalt Index price for liquid asphalt cement (AC) is established each month by using the published price in the Asphalt Weekly Monitor® (see Sec 109.15 for full details) on the Monday preceding the date of MoDOT’s normally scheduled monthly letting. Only one price is established each month, therefore special lettings do not have any effect on this process. For months where MoDOT does not schedule a normal monthly letting, the published price on the third Monday of the month shall be used. The Monthly Asphalt Index is posted on the MoDOT website as soon as possible for use in calculating the adjustments. The Monthly Asphalt Index recorded for the month of the project letting is the Asphalt Base Index for that project. The formula used to calculate the adjustment is based on the difference between the Asphalt Base Index and the Monthly Asphalt Index for the month prior to the month the work was performed. Work is always grouped by pay period for the adjustment calculation.

**What about work performed on the first day of the month since that day is technically included with the previous month’s payment estimate?**

The AC price index specification specifically states that work performed on the first day of the month will be included with the previous month. This was done to simplify the calculation of adjustments by keeping the monthly index periods in sync with our pay estimate schedule. For example, work performed on May 1, 2017 will be included with the April 16 – May 1 estimate period and will be adjusted according to the Monthly Asphalt Index for March, 2017. The only exception is the end of the fiscal year (see next question).

**What about work performed on July 1 and October 1, the first day of the state and federal fiscal year?** June 30 and September 30 represent the end of the state and federal fiscal years respectively, which requires MoDOT to shorten the estimate period by one day to separate contractor payments by fiscal year. However, the intent of the specification is to keep the adjustments in sync with the payment estimate cycle regardless of these minor shifts. Therefore, when calculating the adjustment for work performed on July 1 or October 1, you should group that day with the work performed from the 2nd through the 15th, just as you will do for the pay estimate. For example, work performed on July 1 will be grouped with the work for the July 1-15 estimate and the adjustment for that entire period will be based on the June asphalt index.

**How do I determine the quantity of tons of hot mix when the mix is paid by the square yards?**

Just as we do for fuel adjustments, we use the plan thickness and the measured quantity of square yards to compute the volume in cubic yards, and then use our standard conversion factor of 1.98 tons/cubic yard to convert to tons. The [spreadsheet for computing the adjustment for hot mix asphalt paid by the square yards](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Hot_Mix_Asphalt_SY.xlsx) will do this conversion for you after you enter the thickness. See Example #2 below for hand calculations.

**What about contingent item work, should you use the letting date or change order date to determine the Asphalt Base Index?**

When a contractor has selected to accept the AC Index in the original contract, that choice also applies to all qualifying contingent items unless otherwise agreed upon and stated in the change order. The Asphalt Base Index (E) for calculating the adjustment for contingent items is the letting date, just as it is for contract items. It is a good practice for REs to state this fact in the change order, but even if they don’t, existing contractual language establishes the Base Index as the letting date. This same practice also applies to fuel adjustments, when applicable.

**What about work that is performed past the contract completion date when the index continues to rise?**

Per terms in Section 109.15 for AC Index, MoDOT does not assume the risk for an escalating AC index for work performed after the contract completion date. When this occurs, the monthly index used in the formula shall be the lower of the monthly index for the month prior to the month the work was performed and the monthly index on the contract completion date (or the adjusted contract completion date when there are excusable delays). Note that the [AC Index Price Adjustment – Sealcoat spreadsheet](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Seal_Coat.xlsx) provided does not adjust for work performed past the contract completion date so the AC adjustment calculation must be done manually or force the spreadsheet to use the correct index.

**When a contractor uses a higher type mix at their own expense, which AC percentage should I use to calculate the adjustment?**

Using a higher type mix is allowable at “no additional cost to the Commission”, so if this was not discussed prior to performing the work, then technically you would use the percentage that results in the lesser adjustment. However, it is better to discuss this prior to performing the work and issue a change order that states the contractor has elected to use a higher type mix and that the percent of virgin AC from that job mix will be used in the calculation of the AC adjustment.

**What about the effective binder from RAP and RAS?**

For hot mix asphalt, the calculated adjustment only applies to the virgin asphalt cement. The percent of virgin AC on the job mix should be used for the calculation unless there is an approved change in target AC that meets the requirement for a field mix redesign. The asphalt cement contribution of RAP and RAS is excluded from the AC adjustment.

**Where do you find the contract terms for the four types of AC price adjustments?**

The contractor’s declared choice to accept or decline each of the four allowable AC adjustments can be found in the front of the contract.

The terms for administering the Asphalt Cement Price Index for hot mix asphalt can be found in Section 109.15. This specification describes the adjustment for hot mix asphalt and serves as the basis for the other three adjustment types. Terms for administering the AC index for Seal Coat, Asphalt Undersealing and Polymer Modified Emulsion Membrane (when used in conjunction with UBAWS) can be found in Section 109.15.

**Can the spreadsheets be trusted to give accurate results or should we hand calculate to verify?**

As with any automated process, you should always verify the accuracy of the results. While the spreadsheets are normally reliable, there is always the possibility of data entry errors, including the AC index prices which are entered into a database by others. You should always perform hand calculations on at least 10% of the estimate periods for quality assurance. The District Final Plans & Reports Processor should also hand calculate a few random estimate periods. The [posted asphalt index prices](http://www.modot.org/eBidLettingPublicWeb/viewStream.do?documentType=general_info&key=2378) can be found on the MoDOT external website. Sample calculations are provided below.

**Calculation Examples**

The adjustment for hot mix asphalt is calculated using the following formula:

A = (B X C/100) X (D – E)

Where:

A = Dollar value adjustment for mix placed during the payment estimate period.

 B = Tons of asphalt mixture placed during the payment estimate period.

 C = Percent of virgin PG asphalt binder as listed in the job mix formula.

 D = The Monthly Asphalt Index for the month prior to the month the asphalt mix

 was placed.

 E = The Asphalt Base Index = the Monthly Asphalt Index for the month the

 project was let.

Link to the Monthly Asphalt Index prices posted on the MoDOT web page:

HOME >> business >> contractor resources >> [bid opening info](http://www.modot.org/business/contractor_resources/bidOpenIndex.shtml)

The following Monthly Asphalt Cement Index Prices are provided for the examples:

June ‘16 $313.75

July ‘16 $313.75

Aug ‘16 $300.00

Sept ‘16 $291.25

Oct ‘16 $287.50

Nov ‘16 $280.00

Dec ‘16 $272.50

Jan ’17 $276.25

Feb ‘17 $291.25

Mar ‘17 $317.50

April ‘17 $328.75

May ‘17 $330.00

**Example #1 (Hot mix asphalt paid per ton)**

Parameters:

* Contract letting date: August of 2016
* 2,000 tons of SP125 mix was placed each day for 9 days from March 29 to April 6, 2017.
* Job mix: 6.1% virgin AC.
* RAP is used (which is irrelevant to the calculation).
* All mix was placed prior to the contract completion date.

**March 29 – April 1** (4 days @ 2,000 Tons/day):

B = 8,000

C = 6.1%

D = 291.25 (AC index for the month prior to the month placed)

E = 300.00 (AC index the month of the letting)

A = (8,000 X 6.1/100) X (291.25 – 300.00)

AC adjustment (March 16 - April 1 estimate period) = -**$4,270.00 (deduct)**

**April 2 – April 6** (5 days @ 2,000 Tons/day):

B = 10,000

C = 6.1%

D = 317.50

E = 300.00

A = (10,000 X 6.1/100) X (317.50 – 300.00)

AC adjustment (April 2 - April 15 estimate period) = **$10,675**

**Example #2 (UBAWS - includes conversion of asphalt paid by SY)**

Parameters:

* Contract letting date: December of 2016
* 90,000 SY of Type B UBAWS was placed May 22-25, 2017.
* Job mix: 5.5% virgin AC.
* Contract indicates that “Yes” was selected for both Asphalt Cement and Polymer Modified Emulsion Membrane.
* All mix was placed prior to the contract completion date.

Refer to Sec 109.15 for more details on the formula for AC adjustment of the polymer modified emulsion membrane.

Calculation for the Polymer Modified Emulsion Membrane:

B = 90,000 SY of membrane placed in May.

D = 328.75 (AC index for the month prior to the month placed.)

E = 272.50 (AC index the month of the letting.)

A = B x (0.9/2000) x (D-E)

A = 90,000 x (0.9/2000) x (328.75 – 272.50)

AC adjustment for polymer modified emulsion membrane = **$2,278.13**

Calculation for the hot mix asphalt used in the UBAWS:

90,000 SY of hot mix @ 0.75 “ (thickness of Type B UBAWS) = 1,875 CY of hot mix.

1,875 CY x 1.98 Tons/CY = 3,712.50 tons of hot mix.

B = 3,712.50 tons of hot mix

C = 5.5%

D = 328.75

E = 272.50

A = (3,712.50 X 5.5/100) x (328.75 – 272.50)

AC adjustment for hot mix use in UBAWS = **$11,485.55**

Total AC adjustment for the membrane and the hot mix used in UBAWS = **$13,763.68**

**Example #3 (Seal Coat placed after contract completion date)**

Parameters:

* Contract letting date: August of 2016.
* Contract indicates that “Yes” was selected for AC adjustment for Seal Coat.
* 8,000 gallons of emulsified asphalt used for Seal Coat. This is the amount after conversion to the volume at 60°F (See [EPG 407.1.5](http://epg.modot.mo.gov/index.php?title=Category:407_Tack_Coat#407.1.5_Method_of_Measurement_.28Sec_407.5.29) for guidance on how to convert to the volume to 60°F for payment.)
* Seal Coat placed May 23-26, 2017 (after the contract completion date).
* Contract completion date is March 15, 2017.
* Since the work was performed past the completion date, you use the lower index price between the month prior to the month the work was performed (April index = $328.75) and the index price in effect on the contract completion date (March index = $317.50). Note that the [AC Index Price Adjustment – Sealcoat spreadsheet](http://epg.modot.mo.gov/forms/CM/AC_Index_Price_Adjustment_Seal_Coat.xlsx) provided does not adjust for work performed past the contract completion date so the AC adjustment calculation must be done manually or force the spreadsheet to use the correct index.

Refer to Sec 109.15 for more details on the formula for the AC adjustment of Seal Coat.

B = 8,000 gallons of emulsified asphalt used for Seal Coat (@ 60°F)

D = 317.50 (March index is used since contract time expired in that month.)

E = 300.00 (AC index the month of the letting.)

A = B x (0.68 x 8.58/2000) x (D- E)

A = 8,000 x (0.68 x 8.58/2000) x (317.50 – 300.00)

AC adjustment for Seal Coat = **$408.41**

**Example #4 (Asphalt Underseal)**

Parameters:

* Contract letting date: June of 2016.
* Contract indicates that “Yes” was selected for AC adjustment for Underseal.
* 10,000 gallons of liquid asphalt undersealing material. This is the amount after conversion to the volume at 60°F (See [EPG 407.1.5](http://epg.modot.mo.gov/index.php?title=Category:407_Tack_Coat#407.1.5_Method_of_Measurement_.28Sec_407.5.29) for guidance on how to convert to the volume to 60°F for payment.)
* Asphalt undersealing was completed from March 20-24, 2017.
* Work was completed prior to the contract completion date.

Refer to the Sec 109.15 for more details on the formula for the AC adjustment of Asphalt Underseal.

B = 10,000 gallons of liquid asphalt used for undersealing (@ 60°F)

D = 291.25 (AC index for the month prior to the month placed.)

E = 313.75 (AC index the month of the letting.)

A = B x (8.66/2000) x (D- E)

A = 10,000 x (8.66/2000) x (291.25 – 313.75)

AC adjustment for Asphalt Underseal = -**$974.25 (deduct)**