

**Hot-Mix Asphalt PFP and QCP Calculations of Monetary Deductions
Appendix E.8**

Effective Date: December 1, 2021

Revised Date: May 13, 2022

This document explains the procedures used to determine the unconfined edge density subplot monetary deduction for Pay for Performance (PFP), and the dust/AB ratio subplot deduction for hot-mix asphalt (HMA) mixtures and full-depth pavements when PFP or Quality Control for Performance (QCP) is selected as the Quality Management Program.

A. Determining and Applying an Unconfined Edge Density Monetary Deduction

The following steps are used to determine the unconfined edge density for a PFP mixture or full-depth pavement and calculate any monetary deductions. The Unconfined Edge Density Deduction Table in Standard Specification Article 406.14 will be used to determine the monetary deductions.

1. Test all sublots for unconfined edge density.
2. Determine the monetary deductions using the Unconfined Edge Density Deduction Table.
3. Total all unconfined edge density monetary deductions. For full-depth pavements, total all monetary deductions for all mixtures comprising the pavement.
4. If the total unconfined edge density monetary deductions are not \$0,
 - a) For full-depth pavements, apply the total monetary deductions to the adjusted full-depth pay.
 - b) For all other HMA mixtures, apply the total monetary deductions for the mixture to the adjusted mixture pay.

B. Determining and Applying a Dust/AB Ratio Deduction

The following steps are used to determine the dust/AB ratio for PFP and QCP mixtures or full-depth pavements and to determine any monetary deduction. The Dust/AB Ratio Deduction Table in 406.14 will be used to determine subplot monetary deductions for both PFP and QCP Quality Management Programs.

Note: The dust/AB ratio monetary deduction procedure is not applicable to Stone Matrix Asphalt (SMA) mixtures.

1. PFP:

- a) Test all sublots for minus No. 200 (75 μ m) (dust) content and asphalt binder (AB) content.
- b) Determine the subplot deductions using the Dust/AB Ratio Deduction Table.

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- c) Total all dust/AB ratio monetary deductions. For full-depth pavements, total all monetary deductions for all mixtures comprising the pavement.
- d) If the total dust/AB ratio monetary deductions are not \$0,
 - 1) For full-depth pavements, apply the total monetary deductions to the adjusted full-depth pay.
 - 2) For all other HMA mixtures, apply the total monetary deductions for the mixture to the adjusted mixture pay.

2. QCP:

- a) Test for the subplot dust/AB ratio for the randomly selected subplot of each lot.
 - 1) If the air voids and field VMA meet the 100% pay factor limits of Table 1 of the document "Hot-Mix Asphalt QCP Pay Adjustments" and compare within the precision limits table of the 1030.08.
 - i. And the dust/AB ratio range is within the \$0 Deduct/Sublot using the Dust/AB Ratio Deduction Table, the entire lot will have a \$0 monetary deduction.
 - ii. If the dust/AB ratio range is within any monetary deduction other than \$0 Deduct/Sublot, all sublots will be tested for dust and AB and the dust/AB ratio monetary deduction will be calculated for each subplot.
 - 2) If the air voids or field VMA do not meet the 100% pay factor limits of Table 1 of the document "Hot-Mix Asphalt QCP Pay Adjustments" or do not compare within the precision limits table of the 1030.08.
 - i. All sublots will be tested for dust and AB and the dust/AB ratio monetary deduction will be calculated for each subplot.
- b) Total all dust/AB ratio monetary deductions. For full-depth pavements, total all monetary deductions for all mixtures comprising the pavement.
- c) If the total dust/AB ratio monetary deductions are not \$0,
 - 1) For full-depth pavements, apply the total monetary deductions to the adjusted full-depth pay.
 - 2) For all other HMA mixtures, apply the total monetary deductions for the mixture to the adjusted mixture pay.

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PFP Unconfined Edge Density Mixture Example

Given: The HMA pavement consists of a 13.0 ft wide mat 1.5 in. thick with the left edge confined without LJS and the right edge unconfined without LJS. Calculate the unconfined edge density subplot monetary deductions within the first mile.

There will be two unconfined edge density sublots along the right edge within the first mile.

Sublot #	Core #	Density	Deduct/Sublot ^{1/}
1	1	90.5%	\$0
2	2	89.3%	\$1,000
Total Monetary Deduction for Unconfined Edge Density = \$1,000			

1/ From the Unconfined Edge Density Deduction Table

In addition to any PFP pay adjustments calculated for the mixture; based upon the air voids, field VMA and density tests; and any dust/AB ratio monetary deductions, a monetary deduction for unconfined edge density of \$1,000 would be applied to this mixture.

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PFP Unconfined Edge Density Full-Depth Example

Given: A 75,000 sq yd full-depth pavement with a surface 24 ft wide is constructed with three mixtures. The contractor used two passes to achieve the width of the pavement. Each mixture was placed in one lift. The first pass of the first two mixtures had both edges unconfined. The second adjacent passes had one unconfined edge (centerline confined). The surface mixture was placed on LJS on all longitudinal joints. Calculate the unconfined edge density monetary deductions for the last 0.3 miles.

The first mix, first pass will have one random core taken in the last 0.3 miles from both unconfined edges. The second pass will have one random core taken in the last 0.3 miles from the unconfined edge. The second mix will be sampled the same way as the first mix. The third mix, the surface, will have no cores because LJS was used.

			Sublot #	Core #	Density	Deduct/Sublot ^{1/}
Mix 1	Pass 1	Left Edge	1	1	90.5%	\$0
		Right Edge	2	2	90.2%	\$0
	Pass 2	Left Edge	3	3	89.2%	\$1,000
		Right Edge		-	-	-
Mix 2	Pass 1	Left Edge	4	4	90.3%	\$0
		Right Edge	5	5	90.1%	\$0
	Pass 2	Left Edge	6	6	88.5%	\$3,000
		Right Edge		-	-	-
Mix 3	Pass 1	-		-	-	-
	Pass 2	-		-	-	-
Total Monetary Deduction for Unconfined Edge Density = \$4,000						

1/ From the Unconfined Edge Density Deduction Table

In addition to the PFP combined pay adjustments calculated from the three mixtures; based upon the air voids, field VMA and density tests; and any dust/AB ratio monetary deductions, a monetary deduction for unconfined edge density of \$4,000 would be applied to this full-depth pavement.

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PFP Dust/AB Ratio Example

Given: A N90 IL-9.5 HMA surface being placed at 1.5 inches thick as an overlay. The project consists of 10,000 tons over 16 miles.

Note: The mix sample and density lots are independent of each other.

In this example the mix sample lot represents 10,000 tons.

Note: All PFP sublots are tested for dust/AB ratio.

Lot #	Sublot #	Dust	AB	Dust/AB Ratio	Deduct/Sublot ^{1/}
1	1	5.1	6.0	0.8	\$0
	2	4.9	6.0	0.8	\$0
	3	4.8	5.9	0.8	\$0
	4	5.3	5.9	0.9	\$0
	5	5.8	5.8	1.0	\$0
	6	7.4	5.8	1.3	\$1,000
	7	7.3	5.7	1.3	\$1,000
	8	5.2	6.1	0.8	\$0
	9	5.3	5.9	0.9	\$0
	10	5.1	5.8	0.9	\$0
Total Monetary Deduction for Dust/AB Ratio = \$2,000					

1/ From the Dust/AB Deduction Table

In addition to any PFP pay adjustments calculated for the mixture; based upon the air voids, field VMA and density tests; and any unconfined edge monetary deductions, a monetary deduction for dust/AB ratio of \$2,000 would be applied to this mixture.

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QCP Dust/AB Ratio Example

Given: A N70 IL-9.5 HMA surface mixture being placed at 1.5 inches thick as an overlay with QCP specified as the Quality Management Program. The project consists of 6,900 tons placed over a distance of 12 lane miles. From the mix requirements table in the contract plans and 1030.05(b) the target air voids are 4.0% and the target minimum field VMA is 15.0%, respectively.

Note: The mix sample lots and density lots are independent of one another. In this example, the first mix lot represents 4,000 tons while the second lot represents 2,900 tons.

Mix samples: Each subplot represents 1,000 tons except for Lot 2, Sublot 3 which represents 900 tons. (Note: All sublots are weighted the same.)

Mixture Sample		Air Voids		Field VMA		District			Deduct/ Sublot ^{1/}
Lot	Sublot	Contractor	District	Contractor	District	Dust	AB	Dust/AB Ratio	
1	1	4.1	3.2	14.9	14.6				-
	2	3.9		14.5		4.8	5.9	0.8	\$0 ^{2/}
	3	2.5		14.0					-
	4	3.0		14.8					-
2	1	2.3	2.5	14.3	14.5	7.3	5.6	1.3	\$1,000
	2	2.1	2.2	14.0	14.1	7.4	5.5	1.3	\$1,000
	3	3.8	3.6	14.7	14.6	5.6	5.8	1.0	\$0
Total Monetary Deduction for Dust/AB Ratio = \$2,000									

Note: Bolded and italicized test results denote the subplot split that was randomly selected by the District for testing.

1/ From the Dust/AB Ratio Deduction Table

2/ If the tested mixture subplot is outside of the \$0 deduction range, the District will test the remaining sublots for dust/AB ratio monetary deductions. This in itself will not trigger testing the other sublots for air voids or field VMA.

Since the District randomly selected and tested the split from Sublot 2 in Lot 1, and the Air Void and Field VMA results were 1) within the 100% pay factor tolerance **and** 2) within Precision Limits of the Contractor's results, and the District Dust/AB Ratio test result is in the range of no monetary deduction, the District does not need to test the remaining sublots in Lot 1 for Dust/AB Ratio and the entire lot receives no Dust/AB Ratio monetary deduction.

For the second lot, the District randomly selected and tested the split from Sublot 1. Since the District Air Void results were not within the 100% pay factor tolerance, the District had to test all

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of the remaining sublots, including Dust/AB Ratio. The Dust/AB Ratio test results for Sublot 1 and Sublot 2 were both in the range of a \$1,000/sublot monetary deduction. The Dust/AB Ratio test result for Sublot 3 is in the range of no monetary deduction.

In addition to any QCP pay adjustments calculated for the mixture; based upon the air voids, field VMA and density tests; a monetary deduction for Dust/AB Ratio of \$2,000 would be applied to this mixture.

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