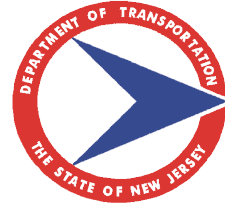


New Jersey Department of Transportation
1035 Parkway Avenue, PO Box 600, Trenton, New Jersey 08625-0600



Baseline Document Change Announcement

**HMA
Surface Course Thickness Acceptance**

BDC04S-01

November 15, 2004

SUBJECT: Revision to Subsections 406.12, 406.14, 406.15 and 406.19 of the 2001 Standard Specifications in both English and Metric units regarding HMA surface course thickness acceptance

Subsections 406.12, 406.14, 406.15 and 406.19 have been revised to introduce a new acceptance procedure for the HMA surface course thickness. This criteria has been applied to determine whether a remove-and-replace of surface course condition exists. This criteria will not be applied to compute pay adjustment. The combined pay adjustment Subsection has been eliminated. Additionally, the allowable air voids range is changed from 3% - 9% to 2% - 8%. A typographical error in the test method number referenced in Subsection 406.14 has also been corrected.

It is expected that the surface course thickness acceptance changes will allow for some construction variation/tolerance while assuring the minimum acceptable thickness.

The following revisions have been incorporated in both the English unit *Standard Input SI2001E1* and Metric unit *Standard Input SI2001M1* as of November 15, 2004.

The following revisions are incorporated in the English unit Standard Input *SI2001E1*:

SECTION 406 – SUPERPAVE HOT MIX ASPHALT (HMA) COURSES

406.12 Air Voids Acceptance Plan.

THE FIRST SENTENCE OF THE FOURTH PARAGRAPH IS CHANGED TO:

Each mixture in a given lot shall be compacted so that the combined percentage of material below 2.0 percent air voids or above 8.0 percent air voids shall be no more than ten percent.

THE SUBPART (2) IN THE FIFTH PARAGRAPH IS CHANGED TO:

- (2) Compute Quality Index.

$$QL = (\bar{X} - 2.0)/S \text{ and } QU = (8.0 - \bar{X})/S, \text{ where "Q" is the quality index.}$$

406.14 Thickness Requirements.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Conformance to thickness requirements will be judged from the full depth cores taken for surface course air voids determinations evaluated according to Section 990, NJDOT B-4.

THE THIRD PARAGRAPH IS CHANGED TO:

Acceptance will be based on total thickness and thickness of the surface course.

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Evaluation of the surface course will be performed solely to determine whether a remove-and-replace or an overlay condition exists, not for pay adjustment. To be judged acceptable, no more than 10.0 percent of the surface course shall be of deficient thickness as calculated by the procedure below.

Acceptance for surface course thickness will be based on the percentage of the lot estimated to fall below the specified thickness as follows:

- (1) Compute the sample mean (\bar{X}) and the standard deviation (S) of the N Test Results (X1, X2, ..., XN):

$$\bar{X} = \frac{X1 + X2 + \dots + XN}{N}$$

$$S = [(X1 - \bar{X})^2 + (X2 - \bar{X})^2 + \dots + (XN - \bar{X})^2 / (N-1)]^{1/2}$$

If for any reason the number of available test results is different from N = 5 for initial testing or N = 10 for retesting, tables for the appropriate sample size are to be used for Step (3).

- (2) Compute Quality Index.

QL = ($\bar{X} - T_{all}$)/S, where "Q" is the quality index and T_{all} is the minimum allowable thickness from the following table:

HMA Designation	Minimum Allowable Compacted Lift Thickness (T_{all})
Nominal Maximum Aggregate Size of Mix	
9.5 MM	1.0 Inch
12.5 MM	1.25 Inches
19 MM	2.0 Inches

- (3) Compute Percent Defective.

Using Table 914-5 for the appropriate sample size, determine the percentage of defective material (PD) falling below the allowable thickness associated with QL (lower limit).

- (4) Retest.

If the initial series of N = 5 tests produces a percent defective value of PD \geq 10, the Contractor may elect to take an additional set of N = 5 drilled cores at new random locations, as designated by the Engineer. The additional cores must be taken within 10 Working Days of the receipt of the initial core results. If the additional cores are not taken within the 10 Working Days, the initial core results (N = 5) will be used to determine acceptance. When additional cores are taken, Steps 1, 2, and 3 will be repeated using the combined data set of N = 10 test values to obtain the total PD estimate using Table 914-5.

- (5) Removal and Replacement.

If the surface course fails to meet the acceptance requirement the Department will require removal and replacement of the lot, or milling and overlaying, at the Contractor's expense. When either replacement or milling and overlaying are done, the new courses are subject to the same requirements as the initial construction.

406.15 Combined Pay Adjustment.

THE ENTIRE SUBSECTION IS DELETED AND IS INTENTIONALLY LEFT BLANK:

406.19 Basis of Payment.

THE SECOND PARAGRAPH IS CHANGED TO:

Pay Adjustments for air voids, rideability, and thickness will be made according to Subsections 406.12, 406.13, and 406.14, respectively.

The following revisions are incorporated in the Metric unit Standard Input *SI2001M1*:

SECTION 406 – SUPERPAVE HOT MIX ASPHALT (HMA) COURSES

406.12 Air Voids Acceptance Plan.

THE FIRST SENTENCE OF THE FOURTH PARAGRAPH IS CHANGED TO:

Each mixture in a given lot shall be compacted so that the combined percentage of material below 2.0 percent air voids or above 8.0 percent air voids shall be no more than ten percent.

THE SUBPART (2) IN THE FIFTH PARAGRAPH IS CHANGED TO:

- (2) Compute Quality Index.

$$QL = (\bar{X} - 2.0)/S \text{ and } QU = (8.0 - \bar{X})/S, \text{ where "Q" is the quality index.}$$

406.14 Thickness Requirements.

THE FIRST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

Conformance to thickness requirements will be judged from the full depth cores taken for surface course air voids determinations evaluated according to Section 990, NJDOT B-4.

THE THIRD PARAGRAPH IS CHANGED TO:

Acceptance will be based on total thickness and thickness of the surface course.

THE FOLLOWING IS ADDED TO THE END OF THIS SUBSECTION:

Evaluation of the surface course will be performed solely to determine whether a remove-and-replace or an overlay condition exists, not for pay adjustment. To be judged acceptable, no more than 10.0 percent of the surface course shall be of deficient thickness as calculated by the procedure below.

Acceptance for surface course thickness will be based on the percentage of the lot estimated to fall below the specified thickness as follows:

- (1) Compute the sample mean (\bar{X}) and the standard deviation (S) of the N Test Results (X1, X2, ..., XN):

$$\bar{X} = \frac{X1 + X2 + \dots + XN}{N}$$

$$S = [(X1 - \bar{X})^2 + (X2 - \bar{X})^2 + \dots + (XN - \bar{X})^2 / (N-1)]^{1/2}$$

If for any reason the number of available test results is different from N = 5 for initial testing or N = 10 for retesting, tables for the appropriate sample size are to be used for Step (3).

- (2) Compute Quality Index.

QL = ($\bar{X} - T_{all}$)/S, where "Q" is the quality index and T_{all} is the minimum allowable thickness from the following table:

HMA Designation

<u>Nominal Maximum Aggregate Size of Mix</u>	<u>Minimum Allowable Compacted Lift Thickness (T_{all})</u>
9.5 MM	25 MM
12.5 MM	32 MM
19 MM	50 MM

- (3) Compute Percent Defective.
Using Table 914-5 for the appropriate sample size, determine the percentage of defective material (PD) falling below the allowable thickness associated with QL (lower limit).
- (4) Retest.
If the initial series of $N = 5$ tests produces a percent defective value of $PD \geq 10$, the Contractor may elect to take an additional set of $N = 5$ drilled cores at new random locations, as designated by the Engineer. The additional cores must be taken within 10 Working Days of the receipt of the initial core results. If the additional cores are not taken within the 10 Working Days, the initial core results ($N = 5$) will be used to determine acceptance. When additional cores are taken, Steps 1, 2, and 3 will be repeated using the combined data set of $N = 10$ test values to obtain the total PD estimate using Table 914-5.
- (5) Removal and Replacement.
If the surface course fails to meet the acceptance requirement the Department will require removal and replacement of the lot, or milling and overlaying, at the Contractor's expense. When either replacement or milling and overlaying are done, the new courses are subject to the same requirements as the initial construction.

406.15 Combined Pay Adjustment.

THE ENTIRE SUBSECTION IS DELETED AND IS INTENTIONALLY LEFT BLANK:

406.19 Basis of Payment.

THE SECOND PARAGRAPH IS CHANGED TO:

Pay Adjustments for air voids, rideability, and thickness will be made according to Subsections 406.12, 406.13, and 406.14, respectively.

Implementation Code R (ROUTINE)

Changes must be implemented in all applicable Department projects scheduled for Final Design Submission at least one month after the date of the BDC announcement. This will allow designers to make necessary plan, specifications, and estimate/proposal changes without requiring the need for an addenda or postponement of advertisement or receipt of bids.

Recommended By:

ORIGINAL SIGNED

Lynn D. Rich
Director,
Quality Management Services

Approved By:

ORIGINAL SIGNED

F. Howard Zahn
Assistant Commissioner,
Capital Program Management