

New Jersey Department of Transportation
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Baseline Document Change Announcement

Longitudinal Joints in HMA

BDC04S-12

March 21, 2005

Subject: Revisions to the *2001 Standard Specifications for Road and Bridge Construction*, Subsections **404.02, 404.08, 404.17, 404.18, 404.25, 404.26** and **908.08** Related to **Longitudinal Joints**

Reference: **BDC05D-01** dated **March 22, 2005** entitled “**Construction Details for Longitudinal Pavement Joints**”

Subsections 404.02, 404.08, 404.17, 404.18, 404.25, 404.26 and 908.08 of the *2001 Standard Specifications for Road and Bridge Construction* have been revised to improve the quality of longitudinal pavement joints. With the release of this Baseline Document Change, BDC03S-07, dated December 31, 2003 entitled “Longitudinal Joints and Visual effects” is hereby superseded.

This BDC should be read in conjunction with BDC05D-01 dated March 22, 2005 entitled “Construction Details for Longitudinal Joints in HMA”.

The revisions have been incorporated into the Standard Inputs via SI2001E1 and SI2001M1 dated March 21, 2005.

The changes to SI2001E1 are as follows:

404.02 Materials.

THE FOLLOWING IS ADDED TO LIST OF MATERIALS IN THE SECOND PARAGRAPH:

Polymerized Joint Adhesive.....908.08

404.08 HMA Paver.

THE FIFTH AND SIXTH PARAGRAPHS ARE CHANGED TO:

When wedge joint construction is required, HMA pavers shall be equipped with a sloped plate to produce a wedge edge at longitudinal joints. The sloped plate shall meet the requirements of Subsection 404.17.1.B and shall be attached to the paver screed extension.

THE SEVENTH PARAGRAPH IS DELETED.

404.17 Spreading and Finishing.

SUBPART 1. "LONGITUDINAL JOINTS" IS CHANGED TO:

1. **Longitudinal Joints.** All longitudinal joints shall be cleaned free from dust and coated before placing the HMA with a uniform application of a polymerized joint adhesive selected from the Department's approved products list. The polymerized joint adhesive material shall be applied at a slow rate to ensure an even coating thickness of an $\frac{1}{8}$ of an inch over the entire joint face. For echelon paving the longitudinal joints need not be treated with the polymerized joint adhesive.

The paving shall be done with the spring loaded end plates of the paver in the "down" position. When constructing the first lane, care shall be exercised in rolling so as not to displace the line and grade of the edges of the HMA. The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches. The joint in the surface course shall be offset from the lane lines by 6 inches except for the centerline of a roadway in which the joint shall fall between the double yellow traffic stripe.

Paving, compaction and the supply of material shall proceed at a uniform rate with minimal or no stopping.

If a single paver does not spread the HMA material the entire width of the roadway, two pavers shall be used provided that the rate of production of HMA material can be maintained. The second unit shall follow within 300 feet of the first unit in echelon, so as not to permit cooling of the longitudinal joint between the two lanes. If echelon paving is to be utilized, the distance that the screed and end gate of the trailing paver shall extend over the uncompacted HMA layer behind the first paver shall be 1 inch or less. The inside end gate of the second paver must be set at the same level as the bottom of the screed plate of the first paver. Raking of the joint is not needed.

A wedge joint shall be constructed when traffic is to be maintained and lift thickness is greater than $2\frac{1}{4}$ inches. A vertical edge joint will be permitted for lift thickness $2\frac{1}{4}$ inches or less when traffic has to be maintained. For lift thickness greater than $2\frac{1}{4}$ inches and traffic is not required to be maintained, a vertical edge shall be utilized.

Longitudinal joints shall be constructed utilizing one of the following methods:

- A. **Vertical Edge Joint.** The paver shall be positioned so that in spreading, the HMA material uniformly overlaps the edge of the lane previously placed by 1 to 2 inches and shall be left sufficiently high to allow for compaction. In general, the height of the uncompacted HMA above the compacted HMA shall be $\frac{1}{4}$ inch for each 1 inch of compacted mix. The overlapped HMA material being placed in the abutting lane shall be tightly crowded (bumped) over the joint. Any material in excess of the 1 to 2 inch overlap shall be pulled away from the joint and removed instead of broadcasting onto the new mat. When compacted, the new mat at the joint shall be even or slightly higher (Maximum $\frac{1}{8}$ of an inch) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of $\frac{1}{8}$ of an inch or more lower than the previously placed adjacent HMA layer, all paving operations shall cease until corrective action is taken by the Contractor to prevent reoccurrence. For all longitudinal joints that do not meet this requirement, the Contractor shall saw joints according to dimension guidelines of Subsection 404.19 and seal with an approved sealer.
- B. **Wedge Joint.** The sloped plate of the paver shall produce a wedge edge having a face slope of 3H:1V. The plate shall be so constructed as to accommodate compacted layer thickness of 2 to 4 inches. The bottom of the sloped plate shall be mounted 1 inch above the existing surface. The plate shall be interchangeable on either side of the screed. The Contractor shall maintain the wedge configuration under traffic conditions.

All loose material shall be removed from the traveled way before opening to traffic. The rolling operation of the adjoining lane shall proceed as indicated in subpart A above, except that care shall be taken to keep coarse aggregate away from the point where the wedge meets the surface of the previously placed lane.

To assure a true line, the paver shall closely follow lines or markings placed along the joint for alignment purposes. All longitudinal joints shall be constructed parallel to the centerlines within a tolerance of plus or minus 3 inches for every 100 linear feet. If this tolerance is not met, the mat shall be cut back to conform. The width and depth of overlapped material shall be kept uniform at all times. Overlapped material shall be luted back, pushing the material off of the cold HMA and onto the hot HMA mat directly over the joint. In no case shall excess material be broadcast across the new layer. All excess material shall be removed.

404.18 Compaction.

THE FOURTH PARAGRAPH IS CHANGED TO:

When compacting the longitudinal edge of the first lanes placed using the wedge joint, the breakdown roller shall not extend more than 2 inches over the top of the sloped face of the wedge joint. The Contractor shall submit a plan, to ensure material at the wedge edge is properly seated and loose material is removed, for the Resident Engineer's approval prior to the commencement of paving operations.

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

Care shall be taken to prevent lateral displacement of the unconfined edge during the compaction operation. The edge of the drums of vibratory or static wheel rollers shall extend over the free edge of the mat by at least 6 inches. When compacting the joint, while paving the adjacent lane, the roller shall be placed on the newly placed HMA and overlap the joint by a distance of approximately 6 inches.

THE FIFTH PARAGRAPH IS CHANGED TO:

Alternate trips of the roller shall be terminated in stops approximately 2 feet from the preceding stop. When paving in echelon, rollers compacting the mat behind the lead paver shall maintain approximately 6 inches of uncompacted material adjacent to the second paver. After mix from the second paver is placed against the uncompacted edge of the mat from the first paver, the rollers shall compact the HMA on both sides of the joint.

THE FOLLOWING IS ADDED AFTER THE ELEVENTH PARAGRAPH:

After compaction has been completed, the pavement shall be free of all visible defects such as segregation, bleeding, ruts, ridges, roller marks, cracking, tearing, raveling, open or segregated transverse or longitudinal joints, depressed or raised areas around manholes or raised areas around inlets in the Traveled Way or any other defects, as determined by the Resident Engineer. All visible defects shall be repaired to the satisfaction of the Resident Engineer at no additional cost to the State.

At the discretion of the Resident Engineer where it is deemed to be impractical to repair such visible defects, a payment reduction due to nonconformance will be applied according to Subsection 404.26.

COMPENSATION

404.25 Method of Measurement.

THE FOLLOWING IS ADDED AFTER THE SEVENTH PARAGRAPH:

Polymerized joint adhesive will be measured by the linear foot.

404.26 Basis of Payment.

THE FOLLOWING NEW PAY ITEM IS ADDED:

Pay Item
POLYMERIZED JOINT ADHESIVE

Pay Unit
LINEAR FOOT

THE FOLLOWING NEW SUBSECTION IS ADDED:

908.08 Polymerized Joint Adhesive.

Polymerized joint adhesive shall be hot-applied asphaltic joint adhesive/sealer and shall conform to the physical properties in Table 908-6 below.

Table 908-6 Tests for Identification

Property	ASTM Test Procedure	Physical Requirements
Brookfield Viscosity, 400°F	D 2669	3,000 – 10,000 cp
Cone Penetration, 77°F	D 5329	60-100
Flow, 140°F	D 5329	1/4 inch maximum
Resilience, 77°F	D 5329	30% minimum
Ductility, 77°F	D 113	1 foot minimum
Ductility, 39.2°F	D 113	1 foot minimum
Tensile Adhesion, 77°F	D 5329	500% minimum
Softening Point	D 36	170°F minimum
Asphalt Compatibility	D 5329	Pass

The manufacturer of the joint adhesive shall provide documentation of recommended pour temperature and safe heating temperature for the material and shall submit certifications of compliance according to Subsection 106.04.

The changes to SI2001M1 are as follows:

404.02 MATERIALS.

THE FOLLOWING IS ADDED TO LIST OF MATERIALS IN THE SECOND PARAGRAPH:

Polymerized Joint Adhesive.....908.08

404.08 HMA Paver.

THE FIFTH AND SIXTH PARAGRAPHS ARE CHANGED TO:

When wedge joint construction is required, HMA pavers shall be equipped with a sloped plate to produce a wedge edge at longitudinal joints. The sloped plate shall meet the requirements of Subsection 404.17.1.B and shall be attached to the paver screed extension.

THE SEVENTH PARAGRAPH IS DELETED.

404.17 Spreading and Finishing.

SUBPART 1. "LONGITUDINAL JOINTS" IS CHANGED TO:

- 1. Longitudinal Joints.** All longitudinal joints shall be cleaned free from dust and coated before placing the HMA with a uniform application of a polymerized joint adhesive selected from the Department's approved products list as provided in the Special Provisions. The polymerized joint adhesive material shall be applied at a slow rate to ensure an even coating thickness of 3 millimeters over the entire joint face. For echelon paving the longitudinal joints need not be treated with the polymerized joint adhesive.

The paving shall be done with the spring loaded end plates of the paver in the "down" position. When constructing the first lane, care shall be exercised in rolling so as not to displace the line and grade of the edges of the HMA. The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 150 millimeters. The joint in the surface course shall be offset from the lane lines by 150 millimeters except for the centerline of a roadway in which the joint shall fall between the double yellow traffic stripe.

Paving, compaction and the supply of material shall proceed at a uniform rate with minimal or no stopping.

If a single paver does not spread the HMA material the entire width of the roadway, two pavers shall be used provided that the rate of production of HMA material can be maintained. The second unit shall follow within 90 meters of the first unit in echelon, so as not to permit cooling of the longitudinal joint between the two lanes. If echelon paving is to be utilized, the distance that the screed and end gate of the trailing paver shall extend over the uncompacted HMA layer behind the first paver shall be 25 millimeters or less. The inside end gate of the second paver must be set at the same level as the bottom of the screed plate of the first paver. Raking of the joint is not needed.

A wedge joint shall be constructed when traffic is to be maintained and lift thickness is greater than 57 millimeters. A vertical edge joint will be permitted for lift thickness 57 millimeters or less when traffic has to be maintained. For lift thickness greater than 57 millimeters and traffic is not required to be maintained, a vertical edge shall be utilized.

Longitudinal joints shall be constructed utilizing one of the following methods:

- A. Vertical Edge Joint.** The paver shall be positioned so that in spreading, the HMA material uniformly overlaps the edge of the lane previously placed by 25 to 50 millimeters and shall be left sufficiently high to allow for compaction. In general, the height of the uncompacted HMA above the compacted HMA shall be 6 millimeters for every 25 millimeters of compacted mix. The overlapped HMA material being placed in the abutting lane shall be tightly crowded (bumped) over the joint. Any material in excess of the 25 to 50 millimeters overlap shall be pulled away from the joint and removed instead of broadcasting onto the new mat. When compacted, the new mat at the joint shall be even or slightly higher (Maximum 3 millimeters) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of 3 millimeters or more lower than the previously placed adjacent HMA layer, all paving operations shall cease until corrective action is taken by the Contractor to prevent reoccurrence. For all longitudinal joints that do not meet this requirement, the Contractor shall saw joints according to dimension guidelines of Subsection 404.19 and seal with an approved sealer.
- B. Wedge Joint.** The sloped plate of the paver shall produce a wedge edge having a face slope of 3H:1V. The plate shall be so constructed as to accommodate compacted layer thickness of 50 to 100 millimeters. The bottom of the sloped plate shall be mounted 25 millimeters above the existing surface. The plate shall be interchangeable on either side of the screed. The Contractor shall maintain the wedge configuration under traffic conditions.

All loose material shall be removed from the traveled way before opening to traffic. The rolling operation of the adjoining lane shall proceed as indicated in subpart A above, except that care shall be taken to keep coarse aggregate away from the point where the wedge meets the surface of the previously placed lane.

To assure a true line, the paver shall closely follow lines or markings placed along the joint for alignment purposes. All longitudinal joints shall be constructed parallel to the centerlines within a tolerance of plus or minus 75 millimeters for every 30 linear meters. If this tolerance is not met, the mat shall be cut back to conform. The width and depth of overlapped material shall be kept uniform at all times. Overlapped material shall be luted back, pushing the material off of the cold HMA and onto the hot HMA mat directly over the joint. In no case shall excess material be broadcast across the new layer. All excess material shall be removed.

404.18 Compaction.

THE FOURTH PARAGRAPH IS CHANGED TO:

When compacting the longitudinal edge of the first lanes placed using the wedge joint, the breakdown roller shall not extend more than 50 millimeters over the top of the sloped face of the wedge joint. The Contractor shall submit a plan, to ensure material at the wedge edge is properly seated and loose material is removed, for the Resident Engineer's approval prior to the commencement of paving operations.

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

Care shall be taken to prevent lateral displacement of the unconfined edge during the compaction operation. The edge of the drums of vibratory or static wheel rollers shall extend over the free edge of the mat by at least 150 millimeters. When compacting the joint, while paving the adjacent lane, the roller shall be placed on the newly placed HMA and overlap the joint by a distance of approximately 150 millimeters.

THE FIFTH PARAGRAPH IS CHANGED TO:

Alternate trips of the roller shall be terminated in stops approximately 600 millimeters from the preceding stop. When paving in echelon, rollers compacting the mat behind the lead paver shall maintain approximately 150 millimeters of uncompacted material adjacent to the second paver. After mix from the second paver is placed against the uncompacted edge of the mat from the first paver, the rollers shall compact the HMA on both sides of the joint.

THE FOLLOWING IS ADDED AFTER THE ELEVENTH PARAGRAPH:

After compaction has been completed, the pavement shall be free of all visible defects such as segregation, bleeding, ruts, ridges, roller marks, cracking, tearing, raveling, open or segregated transverse or longitudinal joints, depressed or raised areas around manholes or raised areas around inlets in the Traveled Way or any other defects, as determined by the Resident Engineer. All visible defects shall be repaired to the satisfaction of the Resident Engineer at no additional cost to the State.

At the discretion of the Resident Engineer where it is deemed to be impractical to repair such visible defects, a payment reduction due to nonconformance will be applied according to Subsection 404.26.

COMPENSATION

404.25 Method of Measurement.

THE FOLLOWING IS ADDED AFTER THE SEVENTH PARAGRAPH:

Polymerized joint adhesive will be measured by the linear meter.

404.26 Basis of Payment.

THE FOLLOWING NEW PAY ITEM IS ADDED:

<i>Pay Item</i>	<i>Pay Unit</i>
POLYMERIZED JOINT ADHESIVE	LINEAR METER

THE FOLLOWING NEW SUBSECTION IS ADDED:

908.08 Polymerized Joint Adhesive.

Polymerized joint adhesive shall be hot-applied asphaltic joint adhesive/sealer and shall conform to the physical properties in Table 908-6 below.

Table 908-6 Tests for Identification

Property	ASTM Test Procedure	Physical Requirements
Brookfield Viscosity, 204°C	D 2669	3,000 – 10,000 cp
Cone Penetration, 25°C	D 5329	60-100
Flow, 60°C	D 5329	5 mm maximum
Resilience, 25°C	D 5329	30% minimum
Ductility, 25°C	D 113	30 cm minimum
Ductility, 4°C	D 113	30 cm minimum
Tensile Adhesion, 25°C	D 5329	500% minimum
Softening Point	D 36	77°C minimum
Asphalt Compatibility	D 5329	Pass

The manufacturer of the joint adhesive shall provide documentation of recommended pour temperature and safe heating temperature for the material and shall submit certifications of compliance according to Subsection 106.04.

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

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Approved By:

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