

## 450 General Requirements for Asphaltic Pavements

### 450.1 Description

- (1) This section describes requirements common to plant mixed asphaltic bases and pavements. Exceptions and additional requirements are specified in 455 through 475.

### 450.2 Materials

#### 450.2.1 Acronyms and Definitions

- (1) Interpret materials related acronyms used in sections 450 through 499 as follows:

<b>FRAP</b>	Fractioned reclaimed asphaltic pavement
<b>HMA</b>	Hot mix asphalt
<b>JMF</b>	Job mix formula
<b>PG</b>	Performance graded
<b>RAP</b>	Reclaimed asphaltic pavement
<b>RAS</b>	Recycled asphalt shingles
<b>SMA</b>	Stone matrix asphalt
<b>VMA</b>	Voids in mineral aggregate
<b>WMA</b>	Warm mix asphalt

- (2) Interpret materials related definitions used in 450 through 499 as follows:

<b>Additive</b>	A material blended with asphaltic binder or aggregate to enhance the characteristics of the final HMA blend, but that does not alter the binder performance grade.
<b>Asphaltic binder</b>	The predominant asphalt cement in HMA.
<b>Butt Joint</b>	A transverse joint between existing and newly paved surfaces, formed by milling or sawing a vertical notch into the existing surface and then paving against the notch.
<b>Coarse Aggregate</b>	Aggregate predominantly retained on the No. 4 sieve.
<b>Echelon Paving</b>	Paving two or more adjacent lanes with adjacent pavers offset from each other by 200 feet or less.
<b>Fine Aggregate</b>	Granular material having at least 90 percent passing the No. 4 sieve and predominantly retained on the No. 200 sieve.
<b>Fractionated reclaimed asphaltic pavement</b>	Reclaimed asphalt pavement processed by screening and separating by maximum and minimum particle size, asphalt content, asphalt performance grade, and aggregate characteristics.
<b>Leveling layer</b>	A thin HMA layer placed to eliminate irregularities in the profile or thickness of underlying pavement layers.
<b>Lower layer</b>	An asphaltic pavement layer below the upper layer in the completed pavement structure. There may be multiple lower layers.
<b>Mineral Filler</b>	Material predominantly passing the No. 200 sieve.
<b>Modifier</b>	A material blended with the asphaltic binder to enhance its characteristics by modifying the performance grade of the binder.
<b>Notched Wedge Joint</b>	A longitudinal joint consisting of a wedge placed at the edge of the initially paved lane with an overlapping wedge placed on the subsequent lane.
<b>Reclaimed asphaltic pavement</b>	Material resulting from cold milling or crushing existing asphaltic pavement.
<b>Recycled asphalt shingles</b>	Waste material from a shingle manufacturing facility, either new or used material salvaged from residential roofing operations, or any combination of these materials ground to ensure that 100 percent will pass a 3/8 sieve and processed to remove deleterious material.
<b>Tandem Paving</b>	Paving two or more adjacent lanes with adjacent pavers offset from each other by more than 200 feet.
<b>Upper layer</b>	The top asphaltic pavement layer in direct contact with traffic in the completed pavement structure. There is only one upper layer.
<b>Vertical Joint</b>	A longitudinal joint between 2 paved lanes with a vertical or nearly vertical interface between the adjacent mats.
<b>Warm mix asphalt</b>	Asphaltic mixture containing a warm mix additive or using a warm mix process that reduces the mixing and compaction temperatures typically required for that application.

**Wedging layer** A tapered layer of asphaltic pavement used to build up an existing surface.

## 450.2.2 Aggregate Sampling and Testing

- (1) The department and the contractor will sample and test according to the following methods, except as revised with the engineer's approval:

Sampling aggregate <b>products</b> .....	<a href="#">WTM R90</a>
Material finer than No. 200 sieve .....	<a href="#">WTM T11</a>
Aggregate <b>gradation</b> .....	<a href="#">WTM T27</a>
<b>Extracted</b> HMA <b>gradation</b> .....	<a href="#">WTM T30</a>
Sieve analysis of mineral filler .....	<a href="#">AASHTO T37</a>
<b>LA Wear</b> .....	<a href="#">WTM T96</a>
Freeze-thaw.....	<a href="#">WTM T103</a>
Sodium soundness .....	<a href="#">WTM T104</a>
Extraction of <b>asphalt</b> .....	<a href="#">AASHTO T164</a> Method A or B or <a href="#">WTM D8159</a>

## 450.3 Construction

### 450.3.1 Equipment

#### 450.3.1.1 Asphalt Plants

##### 450.3.1.1.1 Plant Scales

- (1) Provide beam, springless, dial, or digital scales on weigh boxes and silos. Use scales of a standard make and design accurate to within 0.5 percent of the maximum required load. For each plant, provide at least ten standard 50 pound weights accurate to within 0.1 percent. For each scale, provide a suitable cradle or platform for applying test loads.
- (2) If using beam scales for aggregate, provide a separate beam for each size of aggregate. Also provide a device that warns when the applied load is within 200 pounds of the required load.
- (3) If using beam scales for asphaltic materials, provide a tare beam and a full capacity beam with a minimum graduation no greater than 2 pounds. Also provide a device that warns when the applied load is within 20 pounds of the required load.
- (4) If using dial scales, provide a standard make springless scale designed, constructed, and installed to be vibration free. Ensure that dials are plainly visible to the operator at all times. Equip with adjustable pointers for marking the weight of each material batched.
- (5) If using digital scales, conform to National Bureau of Standards Handbook 44.

##### 450.3.1.1.2 Automatic Batching

- (1) On contracts with 10,000 tons or more, provide automated batch plants. Ensure that the plants' control system can coordinate mixture proportioning, timing, and discharge by the operation of a single control. Also provide an automatic batch weighing, cycling, and monitoring system.
- (2) On contracts with less than 10,000 tons, if the contractor elects to use batch plant automatic systems, conform to the requirements here under 450.3.1.1.2. The contractor need not use automatic recordation. If the contractor elects to use automatic recordation, conform to [450.3.1.1.4](#) for truck loads, or [450.3.1.1.3](#) for batch weights.
- (3) Ensure that the system accurately proportions mixture components by weight or volume in the proper order and controls the mixing cycle sequence and timing. Provide interlocks that ensure that the scale is at zero before a batch can start and that the batch is mixed completely before discharge. Do not start subsequent batches before completely discharging the previous batch. Also provide interlocks that ensure that batch materials are in the mixer before the batch can discharge. Ensure that unauthorized personnel cannot alter mixture designs and that equipment emits an audible signal if discharging a batch with out-of-tolerance component weights. Ensure that this signal is loud enough to hear throughout the plant area under normal operating conditions.
- (4) Provide adjustable timing devices to control individual component batching and mixing operations. Provide auxiliary interlock cutoff circuits necessary to stop automatic cycling whenever a weighing error exceeding a specified tolerance occurs or when another part of the control system malfunctions.
- (5) Ensure that the batching system automatic control can stop the cycle in the underweight check position and the overweight check position for each material to check tolerance limits.
- (6) Ensure that the scale system is equipped with a device that applies pressure to a scale lever to simulate batching operations for tolerance checks.
- (7) Consistently deliver materials within the full range of batch sizes within the following tolerances:

MATERIAL	PERCENT OF TOTAL MATERIAL BATCH WEIGHT
Coarse aggregate .....	+ 1.0
Fine aggregate .....	+ 1.0
Aggregate for use with salvaged or reclaimed pavement materials.....	+ 1.5
Mineral filler .....	+ 0.5
Salvaged or reclaimed asphaltic pavement material .....	+ 1.5
Asphaltic material .....	+ 0.1
Zero return for aggregate.....	+ 0.5
Zero return for salvaged or reclaimed material .....	+ 0.5
Zero return for asphaltic material .....	+ 0.1

- (8) Unless providing separate tolerance controls for batching mineral filler, reduce aggregate tolerances to +/- 0.5 percent for aggregates delivered before the filler.
- (9) Ensure that the total weight of the batch does not vary by more than +/- 2.0 percent of the designated batch weight.
- (10) Ensure that the electrical circuits for the above delivery tolerances of each cutoff interlock are capable of providing the total span for the full allowable tolerance for maximum batch size. Provide tolerance controls automatically or manually adjustable to provide spans suitable for less than full-size batches. Ensure that the automatic controls and interlock cutoff circuits are consistently coordinated with the batching scale or meter within an accuracy of 0.2 percent of the scale or meter nominal capacity<sup>[1]</sup> throughout the full range of the batch sizes.
  - <sup>[1]</sup> Nominal capacity of a scale is defined as the maximum quantity which the scale or meter can measure.
- (11) If the automatic control or monitoring systems break down, the contractor may operate the plant manually for up to 2 working days.

**450.3.1.1.3 Recording Batch Weights**

- (1) On contracts involving 10,000 tons or more of asphaltic mixtures, unless the contractor elects to record truck loads as provided in [450.3.1.1.4](#), produce an automatic digital record for each batch indicating the proportions of each aggregate component, mineral filler, and asphaltic material.
- (2) Provide a digital recorder that can print multiple copies of mixture reports that give the total weight of asphaltic mixture and asphaltic material both per load and per batch. Include weights of the individual aggregates and fillers. Reports need not provide tare weight and may use accumulative weights. Ensure that reported weights are accurate within +/- 1 kg/500 kg. Allow sufficient time for the scale to come to rest before printing each weight.
- (3) The contractor may use mixture storage silos with digital recorder equipped batch plants if the department determines the storage silo output is coordinated with the recorded batch weights.
- (4) If the recording system breaks down, the contractor may operate the plant without automatic recording for up to 2 working days.

**450.3.1.1.4 Recording Truck Loads**

- (1) If not using automatic batch recording, install a digital recorder as part of the platform truck or storage silo scales. Ensure that the recorder can produce a printed digital record of at least the gross or net weights of delivery trucks. Provide gross, tare, net weights, load count, and the cumulative tonnage; the date, time, ticket number, WisDOT project ID, and mix 250 number; and the mix type including the traffic, binder, and mix designation codes specified in [460.3.1](#). Ensure that scales cannot be manually manipulated during the printing process. Provide an interlock to prevent printing until the scales come to rest. Size the scales and recorder to accurately weigh the heaviest loaded trucks or tractor-trailers hauling asphaltic mixture. Ensure that recorded weights are accurate to within 0.1 percent of the nominal capacity of the scale.
- (2) Submit tickets daily as work is completed. Ensure that tickets identify additives not included in the mixture design submittal or cold weather paving plan. Indicate on the ticket if the mixture is placed under a cold weather paving plan.

**450.3.1.2 Asphaltic Mixture Hauling Vehicles**

- (1) Provide trucks for hauling asphaltic mixtures with tight, clean, and smooth boxes. The contractor may thinly coat boxes with a release agent chosen from the [APL](#). Drain excess release agent after coating. Equip each box with a cover big enough to protect the mixture. Do not use trucks that show oil leaks of any magnitude.

### **450.3.1.3 Transfer Devices**

- (1) Ensure that transfer devices have surge bin capacity adequate to pave continuously at a uniform speed. If maintaining uniform and continuous paving, the engineer may allow the contractor to omit the surge bin. Do not use devices that cause vibrations or other motion that adversely affect the finished ride.

### **450.3.1.4 Pavers**

- (1) Ensure that the screed or strike-off assembly produces a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. Use a screed adjustable for the required crown and cross-section of the finished pavement, including the shoulder if paving integrally.
- (2) Ensure that pavers are equipped with a vibratory screed or strike-off assembly and use vibration at all times during paving unless the engineer allows otherwise. Do not extend the screed with one or more static extensions totaling more than 12 inches at either screed end, except at the shoulder end for paving shoulders. When paving a travel lane, ensure that augers used to spread material in front of the screed are within 12 inches of the travel lane edges being paved.
- (3) Provide pavers with department-approved automatics that control the elevation and slope of the screed. The department will not require automatic controls when paving entrances, approaches, side road connections, small irregular areas, or if the engineer determines using automatic controls is impracticable. Use both grade and slope controls whenever automatics are required, except the engineer may waive the longitudinal or grade control requirement for the final surface. Ensure that the operator can adjust or vary the slope throughout super elevated curves and transitions. If paving shoulders integrally, ensure that the paver can accommodate independent shoulder and travel lane cross slopes. Also ensure that the system allows the sensor to operate on either side of the paver.
- (4) If automatics break down, the contractor may pave under manual control only until the end of that working day.

### **450.3.1.5 Compaction Equipment**

- (1) Ensure rollers are in good mechanical condition, capable of operating both forwards and backwards, and the operating mechanism allows for starting, stopping, or reversing direction in a smooth manner, without loosening or distorting the surface being rolled.
- (2) Equip rollers with a drum or tire lubricator. Do not lubricate with petroleum or tar products.

## **450.3.2 Constructing Asphaltic Mixtures**

### **450.3.2.1 General**

#### **450.3.2.1.1 Preparation and Paving Operations**

- (1) Do not place asphaltic mixture when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 36 F for upper layers or 32 F for lower layers unless the engineer allows in writing. The contractor should place HMA pavement for projects in the northern asphalt zone between May 1 and October 15 inclusive and for projects in the southern asphalt zone between April 15 and November 1 inclusive. [CMM 458](#) figure 458-2 defines asphalt zones. Notify the engineer at least one business day before paving.
- (2) Unless the contract specifies otherwise, conform to the following:
  - Keep the road open to all traffic during construction.
  - Prepare the existing foundation for treatment as specified in [211](#).
  - Incorporate loose roadbed aggregate as a part of preparing the foundation, in shoulder construction, or dispose of as the engineer approves.
- (3) Place asphaltic mixture only on a prepared, firm, and compacted base, foundation layer, or existing pavement substantially surface-dry and free of loose and foreign material. Do not place over frozen subgrade or base, or where the roadbed is unstable.

#### **450.3.2.1.2 Cold Weather Paving**

##### **450.3.2.1.2.1 General**

- (1) The contractor is responsible for the quality of HMA placed in cold weather. Conform to these cold weather paving provisions for work performed under the following:
  - The 460 HMA Pavement bid items.
  - The 465 Asphaltic Surface bid items.
  - Special provisions that require placing mixture conforming to the contract requirements under 460 for HMA pavement or under 465 for asphaltic surface.

#### **450.3.2.1.2.2 Cold Weather Paving Plan**

- (1) Submit a written cold weather paving plan to the engineer at the preconstruction meeting. In that plan outline material, operational, and equipment changes for paving when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40 F. Include the following:
  - Use a department-accepted HMA mixture design that incorporates a warm mix additive from the [APL](#). Do not use a foaming process that introduces water into the mix.
  - Identify the warm mix additive and dosage rate.
  - Identify modifications to the compaction process and when to use them.
- (2) Engineer written acceptance is required for the cold weather paving plan. Engineer acceptance of the plan does not relieve the contractor of responsibility for the quality of HMA pavement placed in cold weather except as specified in [450.5.2\(3\)](#).

#### **450.3.2.1.2.3 Cold Weather Paving Operations**

- (1) Do not place asphaltic mixture when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40 F unless a valid engineer-accepted cold weather paving plan is in effect.
- (2) If the national weather service forecast for the construction area predicts ambient air temperature less than 40 F at the projected time of paving within the next 24 hours, confirm or submit revisions to the cold weather paving plan for engineer validation. Update the plan as required to accommodate the conditions anticipated for the next day's operations. Upon validation of the plan, the engineer will allow paving for the next day. Once in effect, pave conforming to the engineer-accepted cold weather paving plan for the balance of that work day or shift regardless of the temperature at the time of paving.

#### **450.3.2.2 Preparing and Storing Mixtures**

- (1) Heat and combine aggregate and asphaltic material to produce a mixture within the temperature range the mixture design specifies when discharged from the mixer. Mix until achieving a homogeneous mixture with uniformly coated aggregate. The contractor may store the mixture in silos.

#### **450.3.2.3 Transporting and Delivering Mixtures**

- (1) Deliver the mixture to the paver receiving hopper at a temperature within 20 F of the temperature the asphaltic material supplier recommends. Cover loads during inclement weather or when the ambient air temperature falls below 65 F.
- (2) If depositing asphaltic mixture on the roadway, provide equipment to pick up asphaltic mixture from the roadway and load it directly into the paver receiving hopper. Use either a device integral to the paver or intermediate transfer equipment.

#### **450.3.2.4 Correcting Base**

- (1) Before placing asphaltic base or surface courses, correct the existing pavement by filling potholes, sags, and depressions; altering the existing crown; or other corrections the engineer requires. Place asphaltic lower layer mixtures where and as the engineer directs. The contractor may hand place or use blade graders or mechanical spreaders to place mixture used for wedging, leveling layers, or filling holes. Feather the mixture out to become co-planar with adjoining areas and, unless the engineer directs otherwise, compact uniformly as specified in [450.3.2.6.2](#).

#### **450.3.2.5 Spreading and Finishing Mixture**

- (1) Place asphaltic mixtures in layers to the typical sections the plans show with self-propelled pavers. Pave at a constant speed, appropriate for the paver and mixture, that ensures uniform spreading and strike-off with a smooth, dense texture and no tearing or segregation. Do not pave faster than the average delivery rate of asphaltic mixture to ensure, as nearly as possible, continuous paving.
- (2) If placing the initial lane of a given layer, sense off a tight string line, a mobile string line, or a traveling straightedge whichever the engineer approves for the specific field conditions. On subsequent lanes of the layer, the contractor may sense off the adjacent lane surface.
- (3) Avoid raking over machine spread and finished material on surface courses to the extent possible to prevent segregation.
- (4) The contractor may spread material by hand in areas not accessible to pavers. Dump material outside the placement area, spread into place with shovels, and shape to the required grade and contour with rakes and lutes. Do not rake material from a pile of dumped material.
- (5) Do not haul over any portion of a placed layer until after the final rolling is complete on that portion.

- (6) If a longitudinal joint other than the notched wedge joint is constructed, place multilane pavement so that each day's placement in all lanes ends at the same station, unless the engineer directs or allows otherwise.

#### **450.3.2.6 Compaction**

##### **450.3.2.6.1 General**

- (1) Unless the contract specifies otherwise for the particular type of work, compact using the ordinary compaction procedure. After spreading and strike-off and while still hot, compact each layer thoroughly and uniformly by rolling. Roll during daylight hours unless providing artificial light the engineer finds satisfactory. Use the appropriate number of rollers to achieve the specified compaction, surface finish, and smoothness requirements. Ensure that the compacted surface is smooth and true to the established crown and grade.
- (2) Roll the entire surface until achieving the specified compaction and, to the extent practicable, eliminate roller marks. If turning or reversing the roller, or other operations, causes any scuffing or displacement, immediately correct the damage and revise the rolling procedure to prevent further damage. Keep roller wheels moistened to keep mixture from sticking to them. Do not use excess water. Do not disturb the line and grade elevation of edges of the asphaltic pavement or surfacing.
- (3) Along forms, curbs, headers, walls, and at other places not accessible to the roller, compact the mixture thoroughly with hot hand tampers or mechanical tampers giving equivalent compression. On depressed areas, use a trench roller or other engineer-approved equipment.
- (4) Remove and replace material that is loose and broken, mixed with dirt, or is otherwise unacceptable with fresh hot mixture. Also remove and replace areas with excess asphaltic material. Compact replaced mixture immediately flush with the adjacent placement.

##### **450.3.2.6.2 Ordinary Compaction**

- (1) Unless the contract specifies otherwise, compact patching, leveling, and wedging layers of asphaltic pavement or surfacing; all layers of plant mixed asphaltic base and base widening; driveways; and other non-traffic areas until no further appreciable consolidation is visible under the action of the compaction equipment. Use 2 or more rollers per paver if placing more than approximately 165 tons of mixture per hour.
- (2) The engineer will assess the compacted density using the methods specified for the particular type of work.

##### **450.3.2.6.3 Compaction Roller Pattern Determined by Growth Curve**

- (1) When specified in [460.3.3.1](#), compact asphaltic mixture using the roller pattern established during construction of a control strip. Use 2 or more rollers per paver if placing more than 165 tons per hour.
- (2) On the first day of production, construct a control strip under the direct observation of department personnel. After compacting the control strip with a minimum of 3 passes, mark the gauge outline and take a one-minute wet density measurement using a nuclear density gauge in back scatter mode at a single location. Take a density measurement at the same location after each subsequent pass. Continue compacting and testing until the increase in density is less than 1 pcf for 3 consecutive passes. Submit the final roller pattern to the engineer in writing. Once the roller pattern is established do not change the pattern or decrease the number, type, or weight of rollers without the engineer's written approval.
- (3) After establishing the roller pattern, and under the direct observation of the engineer, cut at least one 4-inch diameter or larger core from the control strip density gauge outline. Prepare cores and determine density according to [WTM T166](#). Dry cores after testing. Fill core holes and obtain engineer approval before opening to traffic. The department will maintain custody of cores throughout the entire sampling and testing process. The department will label cores, transport cores to testing facilities, witness testing, store dried cores, and provide subsequent verification testing.

##### **450.3.2.7 Applying Tack Coat**

- (1) Apply tack coat as specified in [455.3.2](#) to each layer of a plant-mixed asphaltic base or pavement that will be overlaid with asphaltic mixture under the same contract.

##### **450.3.2.8 Jointing**

- (1) Place layers as continuously as possible without joints. Do not roll over an unprotected end of freshly laid mixture unless interrupting placement long enough for the mixture to cool. If interrupting placement, ensure proper bond with the new surface. Form joints by cutting back on the previous run to expose the full depth of the layer. After resuming placement, place the fresh mixture against the joint to form intimate contact and be co-planar with the previously completed work after consolidation.

- (2) Where placing against existing HMA pavement, saw, or mill the existing mat to form a full-depth joint.
- (3) Construct notched wedge longitudinal joints for mainline paving of HMA layers 1.75 inches or greater. Extend the wedge beyond the normal lane width as the plans show or as the engineer directs.
- (4) Locate the joint at the pavement centerline for 2-lane roadways, or at lane lines if the roadway has more than 2 lanes. Construct a vertical notch on the centerline or lane line at the top of each wedge. Place a notch at the outside bottom edge of the wedge after compacting each layer. Align the finished longitudinal joint line of the upper layer with the centerline or lane line.
- (5) At the prepave meeting, submit documentation to the engineer that includes the brand name and model of each extruding and compacting device proposed for notched wedge joint construction. Alternatively, submit pictures of fabricated wedging and compacting devices. Do not use devices before engineer approval.
- (6) For notched wedge joints, construct and shape the wedge for each layer using the engineer-approved extruding device and compacting device that will provide a uniform slope and will not restrict the main screed. Compact the wedge with a weighted roller wheel or vibratory plate compactor the same width as the wedge. Clean and apply tack coat to the wedge surface and both notches before placing the adjacent lane.
- (7) For butt and vertical joints, clean and apply tack coat to promote bonding and seal the joint.
- (8) If paving in echelon, the contractor may use a vertical or notched wedge joint. Joints paved in echelon need not be tack coated.

#### **450.3.2.9 Surface Testing**

##### **450.3.2.9.1 Smoothness**

- (1) Test the surface at engineer-selected locations with a 10-foot straightedge or other engineer-specified device. Ensure that upper layers show no variation greater than 1/8 inch between any 2 surface contacts. Ensure that lower layers, shoulder surfacing, and surfacing on temporary connections and bypasses show no variation greater than 1/4 inch between any 2 surface contacts.
- (2) Remove and replace or otherwise correct, using engineer-approved methods, humps or depressions exceeding the specified tolerance.

##### **450.3.2.9.2 Ride Quality**

- (1) Provide QMP for HMA pavement ride quality as specified in [740](#).

##### **450.3.2.10 Paving Shoulders**

- (1) Do not pave shoulders wider than 6 feet integrally. For integrally-paved shoulders the plans do not show, use the material specified for the travel lane. Test the shoulder material according to the mix volumetric and density requirements of the mix type placed.
- (2) If constructing shoulders separately and the placement width is too narrow to accommodate the required pavers and rollers, the contractor may use engineer-approved alternate spreading and compaction equipment. Alternate equipment must be capable of satisfactorily laying mixture to the required width, thickness, texture, cross slope, and smoothness.

##### **450.3.2.11 Safety Edge<sup>SM</sup>**

- (1) Construct safety edge monolithically with and extending beyond the edge of pavements that have no paved shoulder, have paved shoulders 3 feet wide or less, and at other locations the plans show. Safety edge is not required on edges that abut other HMA or concrete elements or where the engineer excludes for constructability issues.
- (2) Compact conforming to [450.3.2.6](#). Ensure that after final rolling the safety edge angle is within the tolerances the plans show. The contractor may use full depth sawing to remove formed edges integrally placed with pavement where safety edge is not required.
- (3) Use a paver equipped with a wedge maker from the [APL](#) capable of constructing the specified edge cross-section. Do not use a single plate strike off.
- (4) Place the finished shoulder material to the top of the safety edge conforming to [305.3.3](#).

#### **450.3.3 Maintaining the Work**

- (1) Protect and repair the prepared foundation, tack coat, base, paved traffic lanes, shoulders, and seal coat. Correct rich or bleeding areas, breaks, raveled spots, or other nonconforming areas in the paved surface.

#### **450.4 Measurement**

- (1) The department will measure asphaltic mixtures by the ton acceptably completed unless the measurement subsection for a particular application specifies otherwise. Provide the engineer with

weigh tickets as specified in [450.3.1.1.4](#). The department or department-authorized testing firms or agencies will test the contractor's truck, storage silo, or plant scales.

- (2) For integrally-paved shoulders the plans do not show, the department will measure the traffic lanes and shoulder separately. The engineer will calculate the quantity of shoulder material and subtract from the total traffic lane/shoulder tonnage actually placed.
- (3) For minor quantities of mixtures and if the engineer approves, the contractor may report batch weights from plant scales as described in [450.3.1.1.1](#), instead of truck or storage silo scale weights.
- (4) The department will measure HMA Cold Weather Paving by the ton of HMA mixture placed conforming to an engineer-accepted cold weather paving plan.

## **450.5 Payment**

### **450.5.1 General**

<b>450.5.1 Add information for inlay paving operations.</b>
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- (1) For integrally-paved shoulders the plans do not show, the department will pay for the shoulder at the unit price for the bid item originally specified in the contract.
- (2) Full-depth sawing to remove integrally placed safety edge where not required is incidental to the contract.
- (3) **Inlay paving operations will limit payment for additional material to 2 inches wider than the final paving lane width at the centerline.**

### **450.5.2 Cold Weather Paving**

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
450.4000	HMA Cold Weather Paving	TON

- (2) Payment for HMA Cold Weather Paving is full compensation for additional materials and equipment specified for cold weather paving under [450.3.2.1.2](#) including costs for preparing, administering, and following the contractor's cold weather paving plan. The department will not pay for HMA Cold Weather Paving for HMA placed as follows:
  - If the lot density is less than the minimum specified in table 4603 for mixture placed under [460](#).
  - On days when the department is assessing liquidated damages.
- (3) If because of an excusable compensable delay under [108.10.3](#), the engineer directs the contractor to pave when the temperature is less than 36 F for the upper layer or less than 32 F for lower layers, the department:
  - Will relieve the contractor of responsibility for damage and defects the engineer attributes to cold weather paving.
  - Will not assess disincentives for density or ride.
- (4) If HMA pavement is placed under [450.3.2.1.2](#) and the HMA Cold Weather Paving bid item is not in the contract, the department will pay for the additional costs specified in [450.5.2\(2\)](#) as extra work. The department will pay separately for providing HMA pavement and HMA surface under [460.5](#), [465.5](#), and the contract special provisions.