DIVISION 500

BITUMINOUS PAVEMENT

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501.00 ASPHALT PAVEMENT CHECKLIST

SSHC References:

Section	*503*	*Asphalt Concrete Pavement*
	1028	*Asphalt Concrete*
	1033	*Aggregates*

Inspection Crew:

Plant Inspector
Laydown Inspector
Lab Inspector

Inspection Equipment:

Nuclear Density Gauge
Thermometer (Surface)
Thickness Ruler
3 m (10 foot) Straightedge
Cleaning Solvent
Insulated Container
Gravel Sampling Bags
Paper Sacks
1.3 m (4 ft.) Carpenter Level
Performance Graded Binder Sample Cans

Inspection Procedures:

1. Review all Plans, Specifications, Road Standards, Materials & Research Manuals/guidance and the *Construction Manual*. Prepare field books.
2. Check traffic control, work zone length, flaggers, signing, pilot car operations.
3. Check project quantities to insure accuracy.
4. Are asphalt concrete mix designs approved?
5. Obtain necessary inspection equipment and review sampling and testing procedures and frequencies.
6. Locate and reference fixtures to be adjusted prior to placing final layer.
7. Does equipment meet requirement of *SSHC*:
   - Trucks
   - Tampers
   - Rollers
   - Material Bins
   - Weighing Equipment
   - Distributors

Spreaders
Brooms
Trenchers
Pavers

8. Check paver screed for proper crown and excessive wear. Are automatic grade and slope controls operational (*SSHC Subsection 503.03*)?
9. Check frequency of vibratory rollers to assure 30-40 impacts/m (100-130 impacts/ft.) with a tachometer.
10. Where a rubber-tired roller is used, verify the manufacturer's recommended contact pressure.
11. Are there enough rollers to obtain required density (*SSHC Subsection 503.04*) and smooth out bumps, ridges, and marks in surface? (*SSHC Subsection 503.03*)
12. Are tarps or insulated truck boxes required? Check for improper use of cleaning solvents. (*SSHC Subsections 501.02 and 503.03*)
13. Check hand equipment. Lutes, rakes, and shovels should be heavy enough to do the job. (*SSHC Subsection 501.02*)
14. Check distributor spray bar height and nozzle angle against manufacturer's recommendations to achieve uniform tack coat. Is the distributor tank calibrated? (*SSHC Subsection 501.02*)
15. Were all vertical faces tack coated?
16. Determine if correct type and rate of tack coat material is being applied. (*SSHC Section 504*)
17. Check each truck load of mix for proper scale ticket. (*SSHC Section 503*)
18. Are trucks properly loaded and within legal weight limits?
19. Is mix being placed at proper temperature range? (*SSHC Subsection 503.04*) Check surface temperature. (*SSHC Subsection 501.01*)
20. Don't expose conveyor. Make sure material is on the hopper conveyor at all times.
21. Is paver hopper near full at all times? (*SSHC Subsection 503.04*) Check flow gates and augers. Paver wings should not be dumped as large aggregate accumulates in the wings. Waste it at the end of each day.

22. Are proper number of trucks available for continuous paving?
23. Compare paver speed to plant output to reduce amount of stopping. (*SSHC Subsection 503.04*)
    Consistent speed results in more consistent pavement properties.
24. Check width, depth, and cross-slope, and compare to spread width typical and typical section as per plan.
25. Check and record yield based on megagrams (tons) of mix required compared to megagrams (tons) of mix used. (Recommend 2-hour intervals)
26. Is gradeline string accurately set and maintained? (*SSHC Subsection 503.04*)
27. Are transverse and longitudinal joints constructed properly? (*SSHC Subsection 503.04 and Construction Manual 502.40.3*)
28. Is surface texture uniform, dense, and free from irregularities, tearing, steel roller marks, check cracks, solvent spots, and segregation? (*SSHC Subsection 503.04*)
29. Check smoothness (*SSHC Section 502*) with 3 m (10 foot) straightedge when profilometer smoothness (*SSHC Section 502*) is not required.
30. Are temporary runouts and fillets in compliance with applicable standards?
31. Obtain required performance graded binder samples. Obtain tack samples if required.
32. Mark original and any recut core locations and observe core sampling. Be sure core holes are properly filled. May use nuclear density gauge to check density.
33. Think safety! Use proper equipment, wear protective clothing, and be aware of contractor's operations.
34. Is the established rolling pattern being maintained and documented? (*SSHC Subsection 503.04*) Are asphalt concrete properties in the test strip determined to be acceptable prior to proceeding?
35. Do shoulder rumble strips conform to the Plan details? Check indentation depth and alignment of strip.
36. Do drop-offs comply with plan details?

37. Has grade and alignment staking been completed and checked?
38. Is subgrade according to plan, stable, and corrected tolerance (*SSHC Section 302*)? Check subgrade according to *Construction Manual 540.1*.
39. Are any string line offsets referenced to permanent stakes?
40. Review "Manufacturer's Operations Manual"
41. Make sure loader operator does not contaminate aggregates.

Laydown Procedures:

1. Keep records on temperature at plant and at laydown site.
2. Asphalt spilled while loading finishing machine must be picked-up.
3. Have Contractor demonstrate how they will maintain level & smooth finishing operation.
4. Keep scale records.
   a. Know what is on the records.
   b. Save records in project files.
5. Note: "Daily Report of Asphaltic Concrete Mass".
6. Do not allow any longitudinal joints in the driving lanes wheel path. Paver must be able to cover the entire lane in one pass.
7. Continuously monitor thickness & notify the Contractor as soon as he/she is out of limits.
8. Take all densities including recuts by random schedule.
9. Traffic will not be allowed over bumps greater than 50 mm (2 inches). Wedges must not exceed 25 mm (1 inch) in 1 m (3 feet) (40 to 1).
10. Before laydown, the surface shall be clean.
11. Verify breakdown rolling has been accomplished before minimum temperature is reached.
12. If thickness is 12.5 mm (½ inch) less than required, then investigate to determine the extent and why.
13. If thickness is 12.5 mm (½ inch) greater than required, investigate to determine the extent and why.

Construction Critical Areas:

1. Asphalt should not be heated to more than 175°C (350°F) in the plant.
2. Asphalt at laydown should be 115 to 160°C (240 to 320°F).
3. Watch joints to make sure they close tightly and attain proper density. Tack vertical face of joints.

Safety Areas:

1. Maintained Traffic:
   a. Keep Contractor vehicles behind pilot car.
   b. Flaggers should use proper procedures.
2. Watch for trucks and loaders traveling at an unsafe speed.
3. Electrical cords near plant must be safely used.
4. All work must comply with OSHA and other applicable safety requirements.

NDR Tests:

1. Nuclear Density Gauge Procedures NDR T 238 & T 587
2. NDR T 99 Soil Density

Sampling Requirement/Freq.:
SSHC Subsection 1028.02

1. Performance Graded Binder
   a. 1 L/Day and 1 L/3400 Mg of mix (1 qt/day & 1 qt/3750 tons).
2. Asphalt Concrete
   a. Density Cores: 1/680 Mg; 5 cores/3400 Mg Lot (1/750 tons; 5 cores/2750 ton lot)
   b. Thickness Cores: (See contract Special Provisions.)
   c. Mix Properties: 1/1000 Mg (1/1100 tons)

Inspector's Records & Forms:

1. Profilogram
2. DR Form 143 - Pavement Marking Report
3. DR Form 261 - Daily Report of Cores Drilled
4. DR Form 295 - Summary of Quantities and Location of Surfaced Intersections and Driveways
5. Density Pay Factor Summary (DR Form 173 or equal)

502.00 ASPHALT PAVEMENT

502.10 ASPHALT PAVEMENT DESCRIPTION

This Subsection explains how to inspect and monitor quality controlled asphalt paving operations. It includes monitoring plant preparation of the asphalt mix and laydown procedures.

502.20 ASPHALT PAVEMENT MATERIAL REQUIREMENTS

502.20.1 ASPHALT ACCEPTANCE AND TESTING

Field Tests and Certification of Materials

Sampling and testing are required to determine whether the quality of materials and construction are in reasonably close conformance with the plans and Specifications.

Project inspectors shall monitor all materials received on a project before they are incorporated into work. Inspectors shall determine that proper inspection reports or certifications are on hand, and that no unusual alterations in characteristics of materials due to handling or other causes occurred.

Schedules in the *Materials Sampling Guide* contain various field tests and sampling frequencies for asphalt materials and mixtures.

The QA/QC program was started in 1993 with the goal of improving the overall quality of asphalt produced and giving the contractor the responsibility for mix design, sampling, testing, and making mix adjustments. In other words, contractors were given responsibility for the product they produce. If needed, most administrative questions involving QA/QC projects can be answered by referring to the Flexible Pavement Engineer [(402) 479-4675].

Asphalt Materials

Acceptance of asphalt materials will be on the basis of test results or certification from an approved source. Formal approval of a source is to be issued by the Materials and Research Engineer.

Each shipment invoice covering asphalt materials delivered to a project shall have a signed certification statement as to type and grade, specific gravity or mass per liter, load quantity, batch number or other identification, and project number. A copy of this invoice shall be furnished to Project Manager or project inspector for review and filing.

The Project Manager must have documentation of the following:

1. Performance Graded Binder
2. Aggregates
3. Asphaltic mix taken behind the paving machine but in front of the rolling operation.
4. Asphalt in-place density.

Performance graded binder suppliers are grouped into two categories (levels).

1. Level-1 suppliers are certified suppliers who have submitted documentation to the Department and as part of the certification process, the Department has inspected the supplier's plant.

2. Level-2 suppliers are approved suppliers that are not certified.

The difference between being level-1 and 2 is that level-1 suppliers are only verified every other day while level-2 suppliers must be verified each day. This verification is between the lab and the supplier and the PM is not involved.

Hot-In-Place asphalt work may require support from the lab. Make sure you notify the lab at least 2-3 days in advance so they can plan to be on-site when the work begins.

Density of the in-place mix can be tested with the nuclear density gauge or by taking cores and measuring the density of the cores. Do not use the contractor's random sampling tables. Use the Department's tables and keep location secret.

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Aggregates

Aggregate gradation and characteristics are covered in detail by *SSHC Section 1033*. Acceptance for quality will be based on source monitoring and test results on assurance or project samples.

502.20.2 RESPONSIBILITY AND DOCUMENTING ASPHALT MIXTURE PROPORTIONING CHANGES

SSHC Section 1028 explains how asphalt mixtures will be controlled. It establishes job mix criteria and corrective procedures to be followed when mixture characteristics are changed from the job mix formula during mix production.

On QA/QC projects, the contractor has sole responsibility for making mix changes; however, the Materials & Research Engineer and Project Manager must be kept informed and involved in these changes. Mix change decisions must be an interactive process between the contractor and the Department.

The Project Manager must also insure that required changes are implemented by the contractor as soon as possible when mixture characteristics fall outside *SSHC* Section 1028 limits. **On each working day, the Project Manager shall determine if work for previous working day was within *SSHC* guidelines.** If not, immediately consult with the contractor and ask what corrective actions have been or will be made. Contact Flexible Pavement Engineer if additional guidance is needed.

Adjusting Performance Graded Binder Contents

On QA/QC projects, job mix control is the contractor's responsibility. The contractor is responsible for sampling, testing, reporting results, and making appropriate mix changes. Also, testing is done up to four times per day at each asphalt plant site so immediate results are available.

When test results for air voids of plant produced mix are outside the limits given in *SSHC Section 1028*, the contractor needs to contact the Project Manager and initiate changes in the asphalt mixture. The contractor’s first efforts at corrective action should be to adjust the aggregate percentages as needed. The adjusting of the performance graded binder content should not be the first step because when performance graded binder content changes are considered to adjust air voids, caution must be used to assure that adequate film thickness is maintained. Reductions in performance graded binder content must not go below the minimum allowable performance graded binder content as calculated in *SSHC Section 1028*. Documentation of changes should be on the contractor's "Daily Plant Report."

Documenting Corrective Action for Noncomplying Air Voids Test on Specimens Taken from Constructed Pavement

Materials Sampling Guide also requires the contractor to report tests for field air voids on mix samples from behind the paver on the contractor's "Daily Plant Report."

If conflicts develop between the contractor's and the NDR'S field voids, then together the contractor and the Department should concentrate on achieving proper voids and resolve the conflicts.

When noncomplying tests for air voids in specimens taken from constructed pavement occur, the Project Manager will notify the Materials and Research Asphalt Lab [(402) 479-4757] if it cannot be corrected. The contractor and the NDR plant inspector will document noncompliance on the contractor's "Daily Plant Report" containing the noncomplying test results.

In response, the contractor will inform the Project Manager as to what changes in mix proportions, if any, should be made. The contractor will furnish project personnel written documentation for the decision or action taken.

Adjusting Aggregate Proportions

Contractor must occasionally adjust aggregate proportions to consistently comply with the contract provisions and to correct calibration errors.

Contractors shall initiate and make changes necessary to insure compliance to *SSHC Sections 1028 and 1033*. The contractor shall document all changes being made.

Proportion changes which exceed provisions of the contract may require a new mix design unless waived by Project Manager.

Project Managers and inspectors need to be familiar with the contractor's QC program because it should provide many of the guidelines needed for making mix change decisions. Project Managers are expected to reference *SSHC Section 1028* and communicate with Materials & Research if needed prior to, during, and after the contractor makes decisions concerning mix proportion changes.

Proportion changes shall be documented by the contractor on their "Daily Plant Report."

Filler-Bitumen Ratio

SSHC Section 1028 defines the filler-bitumen ratio. Filler-bitumen is the ratio of material passing the 75 µm (#200) sieve divided by percent of performance graded binder in the mix (i.e., tank sticks, etc.).

The Plant inspector should determine if and by how much a contractor proportion change will affect the filler-bitumen ratio. If it is necessary, contact Materials & Research Asphalt Lab [(402) 479-4757] for guidance.

502.20.3 ASPHALT REPORT FORMS

Construction inspection personnel are responsible for monitoring/assisting in field sampling and testing in accordance with requirements of *SSHC* and those outlined in the *Materials Sampling Guide*. Forms are supplied for reporting test results, submitting samples, and as inspector work sheets.

Under the certified plant inspector program and Quality Assurance/Quality Control (QA/QC) program, specific sampling and testing will be done by the contractor's representative per *SSHC Section 1028* and the *Materials Sampling Guide*. Plant

inspectors and the contractor's QC technicians must also be familiar with all applicable specification requirements including the sampling and testing procedures.

Form Identification and Use

- Daily plant operation, job control testing, and material placement for asphalt production are recorded in the field book or project records. Copies of the contractor's reports shall be sent to Materials & Research Engineer and the Project Manager.

- DR Form 12, "Sample Identification Form" must accompany all samples submitted to central materials laboratory and District materials laboratories.

- A mix design letter from the contractor and approved by the Flexible Pavement Engineer is used to define aggregate components of asphalt, to identify material sources, gradation, production limits, and proportions for the asphalt mix designs.

- “Summary Form of Tests of Asphalt Mixtures” is to be used by District materials laboratories to report extraction, sieve analysis, density, voids, maximum specific gravity, etc.

The contractor will use NDR forms for plotting all moving average data, various temperatures and other graphed data.

Although submission of a daily report is not required, it is necessary that each day's production information be recorded in the field notebook. It is very important that the daily placement be identified by station location, side, lift, lift thickness, and material characteristics. This type of information becomes necessary in case of deductions or answering inquiries regarding any traffic accident occurring on the project.

502.30 ASPHALT PAVEMENT EQUIPMENT

502.30.1 INSPECTION AT ASPHALT PLANTS

Project Managers are responsible for verification, inspection and/or monitoring at asphalt plants. They should assure themselves that the contractor's QC inspectors are qualified and have been informed about their specific duties. This should include, but not be limited to, frequency of tests, information to be recorded, and samples to be obtained and held for use by Materials & Research and District laboratories.

The contractor is responsible for all plant inspections. Their duties include constant checks of stockpile handling, equipment settings, mixture appearance, and supervision of scale inspectors and assistant plant inspectors. Plant inspectors should spend part of their time in the laboratory trailer, and assist as needed.

The contractor shall furnish and be responsible for certified plant inspection in accord with *SSHC Section 1028*. All asphalt production, including patching, will be covered by certified plant inspection unless otherwise excluded by contract documents or when 450 Mg (500 tons) or less of asphalt are used on project. Plant monitor requirements are identified in *SSHC Section 1028*.

On QA/QC projects, the contractor's QC lab technician is responsible for meeting all sampling, testing, and documentation requirements as set forth by the current contract. For some contractors, this person may also be responsible for certified plant QC inspector duties as well. It should be possible for two people to handle both QC and Plant Inspection responsibilities on a typical asphalt resurfacing or paving project. The QC technician should maintain good communication with the NDR inspector and Materials & Research personnel especially on test results and mix changes.

502.30.2 INSPECTING THE MIXING TIME OF ASPHALT PLANTS

Project Managers should insure that mixing time is inspected on continuous plants and on batch plants.

Necessary action shall be taken to insure compliance with the mixing time in *SSHC Subsection 503.03*. Inspectors shall check mixing time when work begins on the project and thereafter as they consider necessary to insure compliance. The QC inspector's diary must show when it is done and calculations used.

If mixing time is found to be deficient, the contractor shall increase it to a specified amount. For continuous plants, this is done by decreasing the megagrams of output or by increasing pugmill contents.

Materials & Research personnel will give assistance in determining the mixing time as a component of the plant calibration process.

502.30.3 USE OF SPECIAL EQUIPMENT

Material Transfer Vehicle

The Material Transfer Vehicle provides mix surge capacity to allow more constant paver speed and efficient paving operations. It operates in front of or beside the paver and accepts loads of hot asphalt from delivery trucks. It provides a large surge storage bin that can continually feed the paver hopper.

This vehicles mass is 34,500 kg (75,000 lb.) empty with a maximum additional 31,500 kg (70,000 lb.) mix storage capacity. It has four axles with large flotation tires. Front two axles have 17.5R x 25 flotation tires and rear two axles have 20.5R x 25 flotation tires. Tire pressure is 345 - 450 kPa (50 – 65 psi).

The Bridge Division will verify each bridge capability on a case-by-case basis with the following limitations.

An empty MTV-3500 usually can safety cross all bridges that are not load-restricted, subject to the following conditions:

- Vehicle must be centered on bridge with no other vehicles on bridge.
- Gross mass cannot exceed listed empty mass of 34,500 kg (75,000 lb.).
- Speed of vehicle on bridge cannot exceed 8 km/h (5 mph).

A partially loaded MTV-3500 usually can safely cross all bridges that are not load-restricted, subject to the following conditions:

- Vehicle must be centered on bridge with no other vehicles on bridge.
- Gross weight cannot exceed 45,000 kg (50 ton) (approximately one-third hopper). Note: This situation should be avoided. We prefer the contractor anticipate the need to cross a bridge and have the MTV empty by the time they reach bridge.
- Speed of vehicle on bridge cannot exceed 8 km/h (5 mph).

An MTV-3500 shall not cross any load-restricted bridge without prior approval of the Bridge Division.

Pavement on which MTV-3500 operates must be at least 200 mm (8 inches) in thickness. It shall not be operated on shoulders, subbases, or lower lifts of asphalt pavement. Any damage caused to existing surfacing shall be repaired at the contractor's expense.

These limitations apply for use of vehicle in a construction work zone. Contractors must obtain any necessary permits for moving this vehicle to and from project on an open highway. Do not allow contractor to operate this equipment unless the lane in which the MTV operates is closed to traffic or is controlled by flaggers.

Mat Smoothness Machine

This is an asphalt material receiving hopper and elevator that deposits hot asphalt into paver hopper. Use of this equipment allows for a more consistent paver operation by providing some surge capacity for paver, only on a much smaller scale than the MTV.

Its mass is approximately 8,500 kg (10 tons) empty and has a hopper capacity of 1.7 m^3 (60 ft^3). Mass restrictions are not a concern with this piece of equipment.

Advantages for use of MTV and CR MS-3 include:

- Smoother pavements due to elimination of trucks backing into paver and ability to provide a more uniform operation speed.

- Reduction in potential for truckload interval segregation due to amount of mixing the material receives going through this equipment.

Even with the MTV or CR MS-3, paver hopper should be kept relatively full at all times. If hopper is allowed to drawn down too far, coarse aggregate collected in sides of paver hopper might be drawn down and create streaks of segregation in mat surface.

Windrow Pick-up Equipment

With this process, hot asphalt is deposited in a windrow onto pavement surface using bottom dump trailers. A windrow pick-up elevator deposits the material into paver hopper. Again, primary advantages are contractor efficiency and uniform speed of operation.

Segregation has occurred on several projects on which this equipment was used. Truckload and longitudinal strip type segregation are potential problems with this equipment.

All material deposited onto roadway must be picked up and put through the paver. Material left on roadway will cause surface problems following completion of project.

502.40 ASPHALT PAVEMENT CONSTRUCTION METHODS

502.40.1 UNSTABLE SUBGRADES AND SUBBASES

See *SSHC Sections 302, 303, and 305* for subgrade requirements.

Whenever trucks or other paving equipment cause rutting of the subbase or subgrade in asphalt placement areas, inspectors shall immediately stop construction. Construction shall not be allowed to resume until distorted subgrade or subbase is repaired (*SSHC Subsections 105.03 and 105.10*).

Locating Unstable Areas

Contractors and inspectors should locate by proof rolling, any questionable unstable areas in advance to avoid distortion under equipment. Wet, unstable areas must be dried out or replaced before starting placement of asphalt to avoid unanticipated and costly work shutdowns.

Locating wet or soft areas in advance can be accomplished by testing finished subgrade or subbase with a loaded truck. When the proof truck causes subgrade distortions, the subbase and subgrade must be dried out and reworked.

Construction of asphalt pavement should not proceed unless testing gives a reasonable indication that distortions will not occur during construction of overlying pavement.

Determining Cause

During spring and early summer, unstable subgrades caused by high moisture contents are encountered statewide. This condition is usually seasonal and tends to improve as warmer, dryer summer weather stabilizes subgrade. Additional pavement thickness is not justified to bridge over these particular soft subgrades because of their seasonal nature.

When evaluating individual cases of instability, experienced judgment is advisable because of the similarity in outward appearances between moisture in subgrade due to seasonal conditions and more serious causes such as frost boil, unsuitable material, etc.

If excess moisture is encountered, dry subgrade and recompact.

Drying and Recompaction

This treatment may be paid for as extra work provided the Project Manager authorizes it, and the work is closely monitored by the inspector and the contractor did not cause the wet condition.

SSHC Subsection 205.03 or special provisions require the contractor to disc or take other action to remove moisture and then recompact the soil at their expense. For a natural subgrade, contractors are required, if necessary, to repair distorted areas by scarifying to a depth up to 150 mm (6 inches), aerating, and recompacting at their

expense. Overdepth aeration and recompaction below the top 150 mm (6 inches) shall be paid for as extra work (*SSHC Subsections 302.03 and 503.04*).

When repair, drying, and recompaction are required to correct damage from contractor's operation, all necessary repair will normally be done at the contractor's expense. However, if the Project Manager determines that additional depth of aeration and recompaction are needed, that should be paid as extra work (*SSHC Subsection 302.03*).

Special Treatments

When unusual problems are encountered with unstable subgrades or subbases, the District Engineer should contact Materials & Research for assistance.

502.40.2 GRADELINE STRINGS AND EDGE ALIGNMENT

New Construction

The inspector should make frequent measurements to insure the guideline string has been correctly set and maintained. Support arms used to secure the guideline string shall be at intervals close enough to minimize chords on curves and other irregularities. Make the curve look like a curve.

Guideline strings placed on two-lane asphalt pavement should be located by measuring from redhead nails placed on centerline. Placement of a lower asphalt layer will cover redheads. For succeeding lifts, guideline string should be located by measuring from exposed nails used to hold string for each previous lift.

Resurfacing

When resurfacing two-lane PCC pavement, contractors may locate guideline strings on shoulders along outer edges. To insure that parallel alignment is used for an adjacent lane, the gradeline string for that lane shall be located by measuring across pavement from the first string.

True edge alignment controls the correct lap at each longitudinal joint. If insufficient lap, the joint will lack density resulting in raveling and joint deterioration. Excessive lap produces an objectionable wide scab of mixture on the surface next to the centerline joint, resulting in an unacceptable appearance.

An intended lap of 25 mm (1 inch) with a variance of 12.5 mm (½ inch) will normally be the optimum overlap for longitudinal joint construction. To maintain these close variances, adjacent lane must be constructed with true edge alignment.

The finishing machine operator shall follow the guideline string exactly. If the machine goes off line for any reason, it shall be adjusted back onto the line immediately. It is incorrect to smooth out the edge alignment by coming back onto the line gradually. This results in long stretches where incorrect lap at longitudinal joint will occur. When batch trucks bump finishing machines off line on curves, movement is usually down the slope of the curve. If the machine is brought back on line gradually, an objectionable, long, straight chord will result in what is supposed to be curved edge alignment.

Irregular edge alignment due to any cause, including adjustments of finishing machine, shall be corrected at once by hand tools. When corrections in edge alignment are

unable to be made promptly after they occur, the inspector shall require the finishing machine to be stopped until workers catch up with making corrections.

When constructing handworked areas such as driveway returns and bridge approach tapers, edge alignment may become irregular during rolling because small, high, and low spots in handworked surface tend to extend in width unevenly. Edge alignment of handworked areas can be made true by first rolling the surface with a steel roller, then immediately trimming the edge with hand tools while the mixture is still hot and workable.

502.40.3 LONGITUDINAL JOINTS

To obtain adequate compaction at longitudinal joints, the contractor shall place sufficient thickness of mix to compensate for 20 to 25 percent reduction in thickness that normally occurs from rolling. If thickness is insufficient prior to rolling, joint will usually be smooth in appearance but lack density because of inadequate compaction. **Make sure density is checked along the joints.**

The vertical face of exposed, longitudinal joints must be tacked before the adjacent lane is placed. This treatment is very important to insure a seal at the joint. No tack coat shall be sprayed on the surface of lane being matched. Shields on distributor spray bar will help protect adjacent lanes (*SSHC Subsection 503.04*).

@ If overlap is maintained at approximately 1 inch (25 mm) and thickness of joint is correct, brooming or raking may not be necessary to obtain a good joint. However, occasional corrections with hand tools may be necessary. When hand work is completed, excess material should be wasted as opposed to scattered on lane being constructed.

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502.40.5 DENSITY CONTROLS FOR ASPHALTIC CONCRETE CONSTRUCTION (*SSHC Subsection 503.06*)

Specifications for asphaltic construction require each layer to be compacted to a density not less than a given percentage of the Rice voidless density.

Density of pavement is determined from cores cut by the contractor or by nuclear density gauges, normally on the working day following construction. The method of mix density determinations will be determined by the contractor, and any disputes will be resolved with cores.

@ One hot box sample per sublot [750 tons (680 Mg)] will be obtained from the roadway surface by the contractor and transported to the field lab for testing. The lab will determine the voidless density. The location of the sample shall be a secret and it must be random.

An average of the voidless densities for a day's production will be used to determine the degree of field density.

@ Five samples shall be cut from each 3750 tons (3400 Mg) or use Nuclear Density Gauge to determine density.

@ The 1,000 ton test strip (and smaller test strips in earlier contracts) is independent of the tonnage listed in the random sampling schedule provided to the PM. The random sampling schedule becomes active following the placement of the 1,000th ton of an approved test strip.

The Specifications also describe a procedure for field density evaluation together with a schedule for payment adjustments when noncompliance occurs. Project inspection personnel shall observe the following:

- The contractor is required to take *a* prescribed number of samples at locations selected and marked out by the project inspector. The project inspector will witness the core sampling. A circle approximately 16 inches (400 mm) in diameter is adequate for identification of sampling location. The core should be taken from within the area identified. It is not appropriate for the contractor to use a nuclear device to "hunt" for a particular spot to sample; coring locations are no longer random when a nuclear device is used in this fashion.

@

- Sample locations are identified in the random sampling schedule which will be provided by Materials & Research. Keep the location a secret. A core will not be taken less than 12 inches (300 mm) from the edge of a given pass of the finishing machine. Procedure for identifying random locations should provide for the potential to obtain a core sample at any distance 12 inches (300 mm) or greater from the edge.

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- If the layer being sampled adheres to a lower layer, it may be necessary to sample through two or more layers or full depth. The contractor will need to remove the extra depth by sawing the sample with a masonry saw. It may be necessary to cool the sample by refrigeration or ice to prevent damage during sawing. It is important that core drill bits be kept sharp.

- Each sample shall be inspected carefully by the contractor and inspector prior to testing. Be sure each core sample is representative of the density of the mixture placed and not damaged. If damage is noticeable, discard without testing and take another to replace it.

- If tests indicate that density is less than the specified percentage, the sample shall be retested to insure accuracy. The contractor can request another random sample be taken. (See *SSHC Subsection 1024.02*.)

- Tests on density samples give lower results if samples are damaged during handling. Contractors and project inspectors are advised to use extreme care when taking, transporting, and preparing cores for testing.

- Samples should be transported on hard flat surfaces to avoid loss of density by distortion. If necessary, samples should be stored in a cool place and on a hard flat surface.

- Specifications also require the contractor to take density samples as promptly as practical as prescribed by NDR T 168. Samples should be taken no later than the working day following placement. If the contractor is unable to comply with this timing, the project inspector shall stop construction until the contractor is able to do so.

- NDR personnel shall be responsible for performing density tests as prescribed by NDR T 166 using the contractor provided samples.

- Any failures should be reported to the Project Manager and to the contractor on the day tests are performed.

- When rerolling is performed, insure the area that is rerolled is the complete area of low density, not just the area of the sample.

Asphalt Compaction

@ Many Superpave mixes exhibit what is called a "Tender Zone" during compaction. You will have to confirm the contractor has determined the "Tender Zone" for the mix. Normally the "Tender Zone" is between 230° and 160°F. **When the asphalt is between 230° and 160°F stop compaction rolling.** Do the finish rolling below 160°F and make sure heavy and intense compaction rolling is done above 230°F.

Procedures for Construction of Test Strips (*SSHC Subsection 503.04*)

SSHC Subsection 503.04 requires the contractor to construct a control (test) strip for all mixture types except S.P.S. Test strips are used to evaluate properties of asphalt mixture and identify an effective roller pattern.

Proper construction and documentation of the test strip is the responsibility of the contractor and shall be provided by the contractor to the NDR inspector.

Document the procedure that was followed to construct the test strip.

Resolving Density - Void Conflicts

The project inspector should be aware that the field laboratory and compacted voids are to be tightly controlled. This may require more compactive effort for compliance. Become familiar with other controls by reading the *Materials Sampling Guide* and asking questions of Materials & Research personnel.

For the case where specified density is met, but field laboratory voids are outside designated limits for two moving average points, the production will cease. The Project Manager may allow production to start following agreement on corrective action to be taken. The contractor will select the combination of rollers to be used and preliminary rolling pattern. Nuclear gauge readings would normally be taken after each pass or series of passes.

The inspector shall only observe and document this process. Documentation of type and amount of compactive effort shall be recorded. Inspector will then select and mark out five random core sites within the test site. Density cores taken by contractor will be tested and results reported as soon as possible.

Cooperation between the project inspector, Materials & Research, and the contractor is essential to reach a timely solution. If all anticipated results are not met, further experimenting with a different combination of rollers and operation should be performed. Changes in gradation may be one of the first items looked at by Materials & Research. Changes in performance graded binder content would be one of the last items. Relief from minimum laboratory voids specified may only be approved by Materials & Research.

502.40.6 LAYING WIDTHS FOR ASPHALT

Plans for asphalt projects will show the overall dimensions of finished pavement.

When spreading layers of asphalt 1 ½ inches to 2 inches (38 to 50 mm) in thickness, a typical 24 foot (7.2 m) pavement may broaden 2 to 4 inches (50 to 100 mm) in width
@ during rolling. Therefore, laydown width before rolling might require) 3 inches (75 mm) less than final design width. An intended lap of 1 inch (25 mm) at the longitudinal joint is best for proper joint construction but seldom seen these days because the contractor has to have someone "set up" the inch overlap. Use of a cutoff shoe when matching a longitudinal joint is not acceptable.

When using finishing machines that spread the pavement full width, the inspectors shall insure that contractors adjust the spreading width so the final dimensions conform to the dimensions specified in the project documents.

The finishing machine screed extensions are usually available in 6 inches (150 mm)
@ increments. Where standard screed extensions are utilized to increase the paver width by more than 12 inches (300 mm), the paver auger must also be extended. Many new pavers are equipped with automatic screed extensions which can be adjusted to conform to the required width for most resurfacing situations. Some paver models have automatic auger extensions as well.

502.40.6a POLICY FOR PLACEMENT OF TEMPLATE CORRECTION ON OVERLAY PROJECTS

Effective immediately, the following shall be Department of Roads policy for placement
@ of asphaltic concrete template correction quantities. **This policy shall be applicable to all new and existing contracts.**

(1) When constructed under traffic maintained conditions and the **design thickness is greater than 2 inches (50 mm)** for the asphaltic concrete type and nominal aggregate size to be used on the surface layer, the asphaltic concrete shall be placed in **more than one layer. The proposed compacted placement thickness of the top layer shall not exceed 2 inches (50 mm).** Asphaltic concrete provided for template correction shall be placed with the lower layer or with the leveling course, if shown in the plans.

(2) When constructed under traffic maintained conditions and the plans indicate that template correction is provided with a **designed** asphaltic concrete **thickness if 2 inches (50 mm) or less,** the total asphaltic concrete thickness, including template correction, shall be placed as a **single layer.**

@

502.40.7 PLACEMENT RATES FOR HOT MIX ASPHALT BASES, BINDER, AND SURFACE COURSES

The inspector shall check contract quantities for accuracy.

In general, placement rates for hot mix asphalt shall be determined using the contract asphalt mass. The estimated unit mass from design standards used to calculate contract quantities will provide sufficient material for construction of design thickness for most mixtures used.

If the contract quantity is not sufficient to construct the required thickness, notify the Construction Division.

For lower layers on resurfacing projects, automatic controls should not be adjusted repeatedly based on megagram yields taken at short intervals. Automatic controls should be allowed to correct for irregularities in underlying base without frequent adjustments. Accordingly, the placement rate for individual truckloads will sometimes vary substantially from contract rate because of irregularities in old base. However, over
@ longer distances, 1650 feet (500 m) or more, taking both sides of the pavement into account, inspectors should select a general spread rate that compares as closely as possible with contract quantities.

For paved shoulders or other construction where dimensions are controlled by specified elevations, existing structures, or other unusual requirements, spread rates shall be adjusted as necessary.

@

502.40.8 COLD WEATHER ASPHALT CONSTRUCTION (*SSHC Section 501*)

SSHC Subsection 501.01 contains limitations for placement of asphalt and liquid bitumen under cold weather conditions. These restrictions apply to pavement surface temperature and time of year, and vary according to whether layer is surface course, lower binder, or base course, and nominal lift thickness.

Cold weather construction problems may show up in the form of increased roughness on profilograph, mat raveling, low density, high voids, segregation, slippage, or failure of tack coat to break. The Project Manager and inspector should be aware of other weather related conditions which may further limit placement.

After September 15, it is appropriate to require tarping and insulation of truck bodies, especially if hauls exceed 3 miles (5 km) (*SSHC Subsection 503.04*). However, if the contractor can demonstrate that the asphalt temperature is not adversely affected by hauling, the tarp and insulation requirements should be waived.

Base temperature is the single greatest factor in the rate of cool down for freshly placed asphalt mat. Consequently, base temperature has direct affect on recommended minimum laydown temperature and rolling time available to obtain specified density.

Wind velocity, air temperature, and cloud cover are additional factors that affect the cooling rate of hot mix asphalt.

For fall work, a cutback asphalt may be used at the Project Manager's option. Cold surface temperatures cause emulsions to lose tackiness and increase breakage time resulting in higher risk of mat slippage.

502.40.9 RUMBLE STRIPS IN ASPHALT SHOULDERS

(The paragraph below moved from Page 247)

Rumble strips will be milled into shoulder on future projects. Department will no longer accept rolled-in rumble strips.

502.40.10 QUALITY CONTROL MONITORING

Requirements for monitoring a contractor's quality controlled plant operation are shown in Table 502.40.1.

Table 502.40.1

NDR Monitoring Program for Asphalt Paving Plants -- Quality Control Methods	
Before production begins, the contractor's plant inspector and the NDR plant monitor should discuss these duties, documentation, sampling and testing plans to ensure compliance with the contract. Any noncompliance or work quality deficiency shall be immediately reported to the contractor's superintendent and the Project Manager. The contractor shall be required to take corrective action. The monitoring requirements are minimum and should be increased if deficiencies occur until the problems are resolved.	
Contractor's Plant Inspection/QC	**NDR Minimum Monitoring Requirement**
Stockpiles	
Observe construction of stockpiles to prevent segregation, contamination, and intermingling.	Inspect before construction begins and once a week thereafter.
Plant Erection	
Inspect material bin foundations. Assure sampling locations are safe and convenient.	Inspect for evidence of settlement. Inspect prior to calibration and after heavy rain.
Plant Equipment	
Check interlocks on aggregate feeders and performance graded binder delivery systems, screens for removal of oversize material, performance graded binder storage tank, tank stick, and general condition of all plant equipment.	Inspect all plant and testing equipment prior to calibration (including lab trailer).
Check scales for sensitivity and accuracy daily.	Check first day and once a week thereafter.
Plant Sampling & Testing	
The contract allows the contractor to test for gradations by either "cold feed" or "ignition burn-off of field sample." Determine moisture content of all aggregates including RAP. (When daily plant output is less than 750 tons); only one sample is required for every 750 tons of asphalt produced.)	Witness at least 1 of 4 process samples of each mix type.
Observe performance graded binder sampling.	Using proper sampling techniques, obtain 1 sample per 7500 tons for Level 1 suppliers and per 3750 tons for Level 2 suppliers and submit sample to Materials and Research Lab.
Obtain density cores and core thickness.	Identify random core locations, observe core cutting, transport to field lab, determine and record core densities, and core thickness.
	1 of 4

NDR Monitoring Program for Asphalt Paving Plants -- Quality Control Methods	
Contractor's Plant Inspection/QC	**NDR Minimum Monitoring Requirement**
Documentation Prepare daily plant report.	Audit entries daily.
Document all checks, tests, and quantities in field books.	Audit entries daily.
Complete tank stick sheet.	Audit daily.
Check for approved sources and certifications for all materials (including material transferred from other projects) and document deliveries.	Audit once per week.
Assure total certified quantities are sufficient for tons produced.	Audit once per week.
Maintain file of all certified material tickets, worksheets, and forms submitted.	Obtain file at end of project.
QC Maintain control charts and data sheets. Document all mix control changes. Document correlation results.	Monitor daily.
	2 of 4

NDR Monitoring Program for Asphalt Paving Plants -- Quality Control Methods	
Contractor's Plant Inspection/QC	**NDR Minimum Monitoring Requirement**
Plant Calibration Observe calibration and obtain copy of all calibration data.	Observe calibration and review calibration data.
Obtain copy of job mix formula.	
Check cold feed bins for method of adjustment.	Participate in check.
Discuss mix designs and plant controls with Project Manager.	Participate in discussion.
Mix Control Monitor coating of aggregates and mixing time.	Observe each day of production.
Monitor and record air, performance graded binder, and mix temperatures on 2-hour intervals.	Check once each day of production.
Monitor truck loading procedures, amount of mix maintained in silo, and operation of hopper/silo gates to avoid segregation.	Observe each day.
Check aggregate proportions, interlocks, and cold feed bin gate settings daily.	Check first day and weekly thereafter.
Inspect trucks for proper/improper use of cleaning fluids.	Monitor daily.
Prepare containers and send to road for hot samples.	
	3 of 4

NDR Monitoring Program for Asphalt Paving Plants -- Quality Control Methods	
Contractor's Plant Inspection/QC	**NDR Minimum Monitoring Requirement**
Asphalt Delivery Determine quantities on hand and calculate performance graded binder added by tank stick or weighing. Compare with brodie meter daily.	Monitor once per day.
Responsible for proper and random sampling of hot asphalt mixture behind paver. Sampling frequency is one sample for each sublot 680 Mg (750 tons) produced.	Monitor daily.
	4 of 4

502.50 ASPHALT PAVEMENT METHOD OF MEASUREMENT AND PAYMENT

502.50.1 TESTING FOR SMOOTHNESS (*SSHC Section 502*)

Equipment for smoothness testing includes the 7.6 m (25 foot) California profilograph and a 3 m (10 foot) straightedge. Pavement surfaces to be tested for smoothness with the 7.6 m (25 foot) profilograph are identified in Plans or Special Provisions. The Contractor is responsible for providing the profilograph. The Department should provide the rolling straight edge. For all projects, the 10-foot straightedge method may be used to identify 1/8" and greater bumps.

Make sure that the tire pressure on the profilograph is maintained at the proper level (210 kPa) (30 psi).

The contractor is not permitted to tight-blade the surface with a grader blade in hopes of minimizing any bumps, and no bonus will be allowed for any section -- regardless of the trace obtained -- if there is any evidence of such scrape marks in that section.

Contractor should be encouraged to test directly behind the finish roller to allow correction of an identified 10 mm (3/8 inch) bump by re-rolling while the mixture is still hot enough to be affected.

Make sure that the profilograph operator maintains a true course while advancing the machine down the road. Weaving, even if not done in an attempt to avoid a rough area, should not be permitted.

Since so much money can be involved, it is very important that you make an effort to have an inspector present while the smoothness testing is being performed. Make it very clear to the contractors that they are to provide adequate notice of any smoothness testing so that inspection can be arranged. DO NOT accept a profilogram if you were not notified about a test and did not have an opportunity to provide inspection.

Incentive/Disincentive Payments for Asphaltic Concrete Smoothness

The following standard items and standard item numbers have been established to provide payment for bumps and smoothness incentives/disincentives:

9300.70	Deduction for Asphalt Concrete Bumps	Each
9300.60	Smoothness Incentive - Asphaltic Concrete	Mg
9300.62	Smoothness Disincentive - Asphaltic Concrete	Mg
9300.64	Smoothness Incentive – Performance Graded Binder	Mg
9300.66	Smoothness Disincentive – Performance Graded Binder	Mg

The mass of asphaltic concrete to which the incentive/disincentive payment is to be applied shall be determined by calculating the asphalt placed in the top layer within those areas defined by the width of the driving lane (or lanes) shown on the plans and the length (or lengths) of the project subject to profiling, except that:

1. When a narrow shoulder is required to be laid with the adjacent lane (inside shoulder on Interstate, for example), the full lane and shoulder width shall be used.

2. When it is impractical to lay additional width except while laying the top lift through the laydown machine (8.5 m (28 foot) roadway, for example), the full width shall be used.

The thickness of the top layer used to determine the mass shall be either:

1. The nominal thickness shown on the plans (if shown), or

2. The lesser of the actual, average thickness laid or the maximum thickness allowed by the Specifications.

The mass per unit volume used to determine the total mass shall be as follows:

Mass Per Unit Volume	Mix Type
143 lb/ft^3 (2291 kg/m^3)	SP3, SP4, SP5
144 lb/ft^3 (2307 kg/m^3)	SP0, SP1, SP2
145 lb/ft^3 (2323 kg/m^3)	SPL
146 lb/ft^3 (2339 kg/m^3)	SPS

The mass of performance graded binder to which the incentive/disincentive payment is to be applied shall be determined by the formula:

[Concrete mix (mass)] (Percent of Performance Graded Binder) = Mass Performance Graded Binder

Unless revised by the Materials and Research Division, the percentage of performance graded binder to be added as shown on the EBM shall be used to compute the smoothness incentive/disincentive for performance graded binder.

When calculating the pay factor for smoothness (PF), round to the nearest hundredth.

The unit price for the incentives shall be calculated by the formula:

$$\frac{(\text{Pay Factor} - 100.00)}{100} \times \text{Contract Unit Price}$$

and entered as a "positive" dollar amount.

The unit price for the disincentives shall be calculated by the formula:

$$\frac{(100.00 - \text{Pay Factor})}{100} \times \text{Contract Unit Price}$$

and entered as a "negative" dollar amount.

Be reminded that the incentive/disincentives calculations are based on the bid price for the asphaltic concrete. Penalties or deductions determined on the Density Pay Factor summary do not enter into these calculations.

When making the contract modifications to place these items into the system, show "Spec. Prov." as the authority for the modification. It is also requested that you show pay factor on the same line; e.g., "Spec. Prov. 101.26%".

Use of Straightedge

Pavement smoothness specification does not relieve contractor of responsibility for proper rolling and workmanship. Each pavement layer is to be inspected visually to insure that surface is free of roller marks and distortion. Transverse joints are to be checked with a 3 m (10 foot) straightedge. The tolerance is 3 mm (1/8 inch).

Corrections for surface irregularities shall be made, if possible, before mixture has cooled to 65.6°C (150°F). A large percentage of irregularities can be corrected by finish rollers above this temperature.

The inspector operating the surface checking straightedge should also observe the surface to insure that all roller marks or roller wheel depressions are smoothed out during the finish rolling. The inspector should observe the longitudinal joints carefully to insure that they have been smoothly rolled as the Specifications require. If surface is not being finished as Specifications require, the inspector shall stop construction until contractor takes corrective action.

STOPPING A BAD OPERATION IS A VALUABLE INSPECTION PROCEDURE.

502.50.2 CHECKING TRANSVERSE JOINTS FOR SMOOTHNESS

SSHC Subsection 503.04 requires the use of a 3 m (10 foot) straightedge for checking transverse joints for smoothness. The contractor should use a straightedge according to the following procedure:

1. The first check with the straightedge shall be made before any saw cuts. The straightedge is used to determine where full thickness of each layer ends and tapered portion begins. The inspector shall require that saw cut be located in full thickness of layer. All of the layer extending beyond the saw cut, including tapered portion, is then removed.

   While the joint is being constructed and checked, the contractor should require the finishing machine to be stopped approximately 10 to 15 m (30 to 50 feet) from the joint. Construction shall not be permitted to continue until the checking has been completed. This permits repaving of the joint, with the finishing machine, if the straightedge indicates a poor riding surface was constructed.

2. The second check with the straightedge is made after the finishing machine has constructed the new layer, but before rolling. The straightedge is used to locate irregularities in the newly constructed layer and any irregularities found that must

be corrected by hand tools. When the straightedge indicates no high or low spots, compaction should be permitted with the initial roller.

3. The third check with the straightedge is across the joint between cold pavement and hot mixture after compacted with initial roller. This third check indicates whether the correct amount of material has been placed. For instance, if freshly rolled layer is too high, it indicates too much material has been placed. If freshly rolled layer is too low, it indicates not enough hot mixture has been placed.

   For that reason, high or low transverse joints are not usually corrected by additional rolling. Instead, corrections should be made by cutting or filling the rolled surface while the mixture is still warm and can be manipulated. If there are unusually high or low areas after rolling, paths must be shoveled through the pavement for finishing machine tracks. Finishing machine is then backed up to the joint and paving operation is started again.

   The above procedure shall be repeated as necessary until the straightedge indicates that a good riding joint has been constructed. If repeated repaving operations cause the mixture to cool to the extent that reuse becomes impractical, it should be removed and wasted.

4. The final procedure for insuring proper construction at transverse joints is checking for true edge alignment. Edge of the freshly rolled layer should be carefully trimmed by hand tools until it matches the alignment of adjoining cold pavement.

502.50.3 PERFORMANCE GRADED BINDER

When payment for an asphaltic concrete mixture is based on megagrams, payment will also be made for performance graded binder as a separate item. Compensation will be made for all megagrams of asphalt binder incorporated into the construction within Specification tolerances. (*SSHC Subsection 503.05*)

Megagrams of performance graded binder paid is not deducted from megagrams of asphaltic concrete mixture measured for payment.

When small quantities of asphalt binder are involved, the design plan may state that performance graded binder is considered subsidiary to asphaltic concrete. Check the special provisions for this reference.

For specific mixes used as patching materials, or in an alternate bid situation, payment may not be made for performance graded binder.

Tank Measurement and Performance Graded Binder Content Determination

At batch plants, automatic or semi-automatic printouts record the actual mass of performance graded binder in each separate batch. This quantity may be used for payment.

Volume measurements will be converted to mass by computation. The amount in storage at beginning of project will be measured or estimated by inspector and added to

amount measured for payment. Asphalt binder remaining in storage at end of project and amount otherwise not used in the work will be measured or estimated by inspector and deducted from amount measured for payment.

Measuring Asphalt Binder for Small Quantities

SSHC Section 109 provides that by mutual agreement, the method of measuring asphalt binder for payment may be modified when small quantities or intermittent operations are involved.

If a recorded mass is not available, quantity may be calculated from intended asphalt binder percent with asphalt plant meter results providing further verification. For small quantities on a given day, the previous day's tank stick may be used as a check.

The project inspector should document procedure selected and reasons for doing so.

Asphalt Binder Quantities and Pay Adjustments

Asphalt binder contract quantities for a project are estimated based on a basic asphalt binder content identified in the contractor's mix design.

When noncomplying viscosity or penetration tests occur, payment for asphalt binder incorporated into affected asphalt mixture is subject to price adjustment as prescribed in the *SSHC Subsection 503.06*.

PG Binder/RAP – Pay Adjustments

The contractor’s initiative to substitute RAP and correspondingly reduce the amount of performance graded binder should not be reason to negotiate a higher price for the binder because it is a major item of work. The Specifications will be modified to add this safeguard.

Binders from different suppliers should not be mixed.

502.50.4 TARGET VALUES FOR ASPHALTIC CONCRETE PRODUCED

The tolerances specified for asphaltic concrete are provided for reasonable variances only. Whenever regular and repeated variances from target values occur, the Project Manager shall insist on quick and corrective action by contractor to secure target values, not simply within tolerance.

The above comments are addressed to asphalt binder content, aggregate tolerance and specifically to air voids and VMA values.

502.50.5 MEASURING ASPHALT MATERIALS

SSHC Subsection 503.03 covers equipment and procedures for measuring the mass of the asphalt materials. When automatic or semi-automatic measurement is used, continuous direct observation of the measuring process by a scale inspector is not required. For manual measuring of loaded trucks, Project Manager may assign a scale inspector. This normally occurs only when accuracy in the measuring procedures is in question.

When witnessing is required, scale inspector should be positioned near contractor's scale operator so measuring can be closely observed. Contractor's representative shall write

the scale tickets and present them individually to scale inspectors for their signatures or initials before each truck leaves the plant.

503.00 ASPHALT CURBS

The Roadway Design Engineer has indicated that asphaltic concrete curb with a steeper than 45-degree face seemed to be a major consideration in a court's ruling. Since a 45-degree face is the design used on present plans, we should not be granting exceptions for any of our present or future contracts.

A number of contractors have requested permission to construct asphaltic concrete curbs to a template and/or dimensions which did not conform to that shown in the plans. You do not have authority to grant such permission on projects.

504.00 STATE MAINTENANCE PATCHING

Asphaltic Concrete for State Maintenance Patching and Performance Graded Binder for State Maintenance Patching are always nonparticipating items and should be paid for with State funds only.

The Construction Division, Final Reviewers Office, has seen estimates that were incorrectly prepared. The estimates do not split these items out from the participating items. Thus, they are not split out on the progress estimates, either.

Please check your projects to assure that these items are in a "State Funds Only" Section. If they are not, create a new section and move them using CICS3, Function 21, Subfunction 4.

Contact Highway Coordinator Finals Supervisor Bill Hitzeman, (402) 479-4456, if you have any questions.

505.00 P.E.P. GUIDELINES

1. NSI must be between 60 and 70 and surfacing doesn't require extensive patching or base work.

2. Existing pavement must be asphalt, not composite or concrete, because of reflective cracking.

3. Current truck ADT must be less than 500.

4. P.E.P. candidate location can't already be in the five-year program.

5. P.E.P. is for 7.3 m (24 feet) width only. Any shoulder work, other than fog seal or armor coat will be charged to the district's regular budget. Existing 7.3 m (24 feet) top will remain 7.3 m (24 feet) even if standard calls for 8.5 m (28 feet).

6. P.E.P. projects are allowed on segments that have no deficiencies other than surfacing. If highway segment has other deficiencies, a future project will also be programmed to correct the deficiencies.

7. A 12.5 mm (1/2 inch) grade raise is acceptable with no shoulder work or guardrail adjustment.

8. P.E.P. projects with a grade raise of more than 12.5 mm (½ inch) will be the exception and will require approval of the Deputy Director-Engineering. The cost of any shoulder work or guardrail adjustment will be charged to the district's regular budget, if the work is done by the contractor. The district's construction budget won't be charged if the work is done by maintenance forces.

9. If grade is raised and contractor does the shoulder work, the District Engineer will determine if dirt is available within the right-of-way.

10. Anything out of the ordinary for a P.E.P. project will be charged to the district's regular budget and may require more than one year to develop the project.

11. Other considerations for P.E.P. projects:

    A. No new mailbox turnouts.

    B. No superelevaton corrections.

    C. Surfacing will be feathered out at intersections and driveways.

    D. P.E.P. projects are considered to be maintenance projects and as such no ADA work will be done.

506.00 MILLINGS

Millings that are to be used as a base or foundation course shall pass a 38 mm (1 ½ inch) screen opening.

Each District remains responsible for specifying the disposition of millings.

Specifications and special provisions need to be crystal-clear as to exactly which millings are available and at what cost.

Pre-letting information should only be released through Frank Brill's (479-4568) office so that no relevant bidding information is withheld from any possible bidder.

507.00 TACK COATS USING EMULSIONS

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For Dilution

SS-1, SS-1H, CSS-1, and CSS-1H grades are specified. Dilution of emulsion is required if nonuniform tack applications are experienced. Dilute at 1:1 ratio, i.e., 1 gallon emulsion to 1 gallon water.

Application Rate for Diluted Emulsion

For diluted material, double the rates of undiluted material application. Example: .03 to .06 gal/yd^2 (0.14 to 0.28 L/m^2) undiluted increased to .06 to .12 gal/yd^2 (.28 to .56 L/m^2) dilute emulsion.

Sample for Compliance

Sample emulsion at spray bar of distributor with bar valve in a circulating position, prior to dilution.

Measurement for Pay

Net liters of diluted emulsion.

Keep in mind, diluted emulsion as supplied normally contains 60% asphalt residue, therefore, a 1:1 field diluted emulsion will contain the minimum of 30% residue (*SSHC Subsection 504.03*).

Settlement of Diluted Emulsions

Varying residue rates of diluted emulsion may be related to blending of original emulsion or settlement while in storage. To minimize this problem, the following steps are recommended:

- Contractor emulsion delivered to storage should be gently circulated prior to pumping into distributor truck.
- If contractor obtains emulsion directly from terminal, the emulsion should be gently circulated prior to use each day.

Material in a storage tank can be circulated with a large diameter, slow turning propeller, or by pumping from top to bottom. Only a small amount of agitation is necessary. **Forced air should not be used for agitation since it may cause the emulsion to break.**

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CHAPTER NOTES:

CHAPTER NOTES: