Iowa Department of Transportation

MINUTES
OF
IOWA D.O.T. SPECIFICATION COMMITTEE MEETING

July 8, 2010

Members Present:	Jim Berger	Office of Materials
	Eric Johnsen, Secretary	Specifications Section
	Bruce Kuehl	District 6 - Construction
	Deanna Maifield	Office of Design
	Doug McDonald	District 1 - Marshalltown RCE
	Gary Novey	Office of Bridges & Structures
	Tom Reis, Chair	Specifications Section
Members Not Present:	John Adam	Statewide Operations Bureau
	Roger Bierbaum	Office of Contracts
	Donna Buchwald	Office of Local Systems
	Troy Jerman	Office of Traffic & Safety
	Dan Redmond	District 4 - Materials
	John Smythe	Office of Construction
Advisory Members Present:	Lisa Rold	FHWA
Others Present:	Ed Kasper	Office of Contracts
	Melissa Serio	Office of Construction

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the agenda dated July 1, 2010:

1. DS-09XXX, Milled Shoulder Rumble Strips.

The Office of Design requested approval of a Developmental Specification for Milled Centerline Rumble Strips.

2. DS-09XXX, Compaction with Moisture Control.

The Office of Construction requested approval of a Developmental Specification for Compaction with Moisture Control.

3. DS-09XXX, Moisture and Density Testing for Special Compaction of Subgrade.

The Office of Construction requested approval of a Developmental Specification for Moisture and Density Testing for Special Compaction of Subgrade.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 1**
Submittal Date: 2010.03.10	**Proposed Effective Date:** 10/2010	
Section No.: DS **Title:** Milled Shoulder Rumble Strips	**Other:**	

Specification Committee Action: Approved with changes. This DS will be included in the General Supplemental Specification issued in April.

Deferred:	**Not Approved:**	**Approved Date:** 7/8/2010	**Effective Date:** 10/19/2010

Specification Committee Approved Text: See attached Draft DS for Milled Rumble Strips – HMA or PCC Surface.

Comments: The Office of Design requested adding "(Shoulder Rumble Strips)" to the bid item name for Asphalt Emulsion for Fog Seal. This will create a separate bid item in Section 2548 for Asphalt Emulsion for Fog Seal, since the application rate is different from the full shoulder application.

The Office of Design requested making this specification an SS so that designers would not need to request the specification. It was suggested to keep the specification as a DS, but include it in the GS in April 2011. The Committee decided to incorporate this specification into the GS in April 2011.

The Committee decided to remove the reference to Article 2307.04, B from the Method of Measurement so there is a separate MOM in this section. The reference to Article 2308.03, D will remain in the Construction section to indicate how the material is applied.

In order to incorporate all of these changes as soon as possible, the Specifications Section suggested creating a DS for all milled rumble strips. The Committee approved this suggestion.

The Office of Construction questioned whether the tolerances shown in this specification (Article 2548.03, B) are adequate or enforceable. District 6 indicated they have had issues with alignment of milled shoulder rumble strips. Milled shoulder rumble strips are measured from the painted edge line, which is typically not placed before milling and can vary from the pavement edge. It was agreed that we need a tolerance and the Committee could not come up with another adequate reference line for milled shoulder rumble strips. District 6 wondered about having options for the reference line, but who would decide what reference line is best versus which is easiest for the Contractor to use. This issue also involved placement of the paint lines, which will not be addressed by this specification. The Committee decided that even if the milled rumble strips deviate from the specified reference line, the efficacy of the rumble strips will not be affected.

There will be no controller for this DS.

Specification Section Recommended Text: See attached Draft DS for Milled Centerline Rumble Strips.

Comments: A DS has been developed to cover milled centerline rumble strips. Per direction from HDMT, no asphalt emulsion will be placed on milled centerline rumble strips.

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

Section 2548. Milled ~~Shoulder~~ Rumble Strips - HMA or PCC Surface

2548.01 GENERAL.

Provide equipment, furnish all necessary labor and materials, and perform all operations necessary for milling ~~shoulder~~ rumble strips in HMA or PCC ~~surfaced shoulders~~ surfaces. Mill ~~shoulder~~ rumble strips to the dimensions and spacing shown in the contract documents. Apply diluted asphalt emulsion to the milled ~~shoulder~~ rumble strips on HMA ~~surfaced shoulders~~ surfaces by means of a bituminous distributor.

2548.02 MATERIALS.

A. Milling.

Equip milling equipment with a cutting head having cutting tips arranged in a pattern as to provide a smooth cut, approximately 1/16 inches (2 mm) between peaks and valleys.

B. Asphalt Emulsion Fog Seal.

1. Use asphalt emulsion Grade CSS-1h, meeting requirements of Section 4140.

2. Dilute the asphalt emulsion with water prior to application to the milled ~~shoulder~~ rumble strip. The dilution rate is one part of asphalt emulsion to one part of water.

2548.03 CONSTRUCTION.

Notify the Engineer if degraded ~~shoulders are~~ pavement is encountered that will not accommodate milled rumble strips. Skip those sections.

A. Test Strip.

Demonstrate to the Engineer on an initial 500 foot (150 m) test section that the equipment and method will provide the desired milled ~~shoulder~~ rumble strip and surface inside each depression without damaging the adjacent pavement. If the desired results are not being provided, as determined by the Engineer, provide different equipment or methods, or make necessary adjustments to provide the desired results. If the initial 500 foot (150 m) section results are unsatisfactory, repair or replace the section as determined by the Engineer, at no additional cost to the Contracting Authority.

B. Milling.

1. Mill shoulder rumble strips in a straight line, offset from the painted edge line as shown in the contract documents. Do not deviate from that offset more than ± 2 inches (50 mm). ~~The offset may be decreased to 6 inches (150 mm) on shoulders with a top width less than 30 inches (750 mm).~~ Ensure the depth of the rumble strips is as shown in the contract documents. The Engineer will randomly check the alignment and depth.

2. Mill centerline rumble strips in a straight line, on the centerline joint as shown in the contract documents. Do not deviate from that location more than ± 1 inch (25 mm). Ensure the depth of the rumble strips is as shown in the contract documents. The Engineer will randomly check the alignment and depth.

3. Remove waste material (millings) resulting from the operation on a daily basis. The waste material may be used as fillet material adjacent to the paved shoulder or it may become property of the Contractor and disposed of off the project. Disposal of material may be at an approved landfill or approved stockpile, or by other methods that will allow the material to be recycled. Remove waste material prior to opening adjacent lane to traffic.

C. Asphalt Emulsion Fog Seal.

1. Ensure the equipment meets the requirements of Section 2001.

2. Ensure the application width covers the entire milled ~~shoulder~~ rumble strip.

3. Place the diluted asphalt emulsion fog seal according to Article 2308.03, D, at a rate of 0.13 gallon per square yard (0.6 L/m_2).

4. Do not place asphalt emulsion on a damp or wet surface.

5. Apply asphalt emulsion during weather conditions under which satisfactory application can be obtained. Do not apply asphalt emulsion when the air temperature is below 50°F (10°C). Do not place asphalt emulsion after October 15 without the Engineer's permission.

D. Limitations.

Do not disturb desirable grass areas and desirable trees outside the construction limits. Do not park or service vehicles and equipment or use these areas for storage of materials. Obtain the Engineer's approval for storage, parking, and service areas.

2548.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Milled Shoulder Rumble Strips.

Stations (meters) shown in the contract documents, measured along each edge of mainline pavement ~~abutting a paved shoulder~~. Unless stated otherwise in the contract documents, no deduction will be made for gapped areas. The quantity will be adjusted for the length of degraded ~~shoulders~~ pavement skipped, as defined in Article 2548.03 of this specification. The quantity will be adjusted for test sections that were deemed unsatisfactory.

B. Milled Centerline Rumble Strips.

Stations (meters) shown in the contract documents, measured along the centerline of mainline pavement. Unless stated otherwise in the contract documents, no deduction will be made for gapped areas. The quantity will be adjusted for the length of degraded pavement skipped, as defined in Article 2548.03 of this specification. The quantity will be adjusted for test sections that were deemed unsatisfactory.

C. Asphalt Emulsion for Fog Seal.

Gallons (liters) as provided in Article 2307.04, B.

2548.05 BASIS OF PAYMENT.

Payment will be the contract unit price as follows:

A. Milled Shoulder Rumble Strips.

Per station (meter) for the type specified.

B. Milled Centerline Rumble Strips.

Per station (meter) for the type specified.

C. Asphalt Emulsion for Fog Seal.

1. Per gallon (liter) for undiluted Asphalt Emulsion for Fog Seal that is mixed and used on the project. Diluted asphalt emulsion that is delivered to the project site, but not applied to the roadway surface will not be considered for payment.

2. Payment is full compensation for cleaning the ~~shoulder~~ paved surface, furnishing and applying diluted

asphalt emulsion, mixing water, and protecting the adjacent pavement and edge lines.					
Reason for Revision: Centerline rumble strips will be added to projects and there is no current spec. Also, the note in 2548.03B that allows reduction to 6" offset is out of date because we now use a 6" offset everywhere.					
County or City Input Needed (X one)			**Yes**	**No** x	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** x	
Industry Notified:	**Yes**	**No** x	**Industry Concurrence:**	**Yes**	**No**
Comments:					

Draft DS-09XXX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
MILLED RUMBLE STRIPS – HMA OR PCC SURFACE

Effective Date
October 19, 2010

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2548 of the Standard Specification:

Section 2548. Milled ~~Shoulder~~ Rumble Strips - HMA or PCC Surface

2548.01 GENERAL.
Provide equipment, furnish all necessary labor and materials, and perform all operations necessary for milling ~~shoulder~~ rumble strips in HMA or PCC ~~surfaced shoulders~~ surfaces. Mill ~~shoulder~~ rumble strips to the dimensions and spacing shown in the contract documents. Apply diluted asphalt emulsion to the milled shoulder rumble strips on HMA ~~surfaced shoulders~~ surfaces by means of a bituminous distributor.

2548.02 MATERIALS.

A. Milling.
Equip milling equipment with a cutting head having cutting tips arranged in a pattern as to provide a smooth cut, approximately 1/16 inches (2 mm) between peaks and valleys.

B. Asphalt Emulsion Fog Seal.

1. Use asphalt emulsion Grade CSS-1h, meeting requirements of Section 4140.

2. Dilute the asphalt emulsion with water prior to application to the milled shoulder rumble strip. The dilution rate is one part of asphalt emulsion to one part of water.

2548.03 CONSTRUCTION.
Notify the Engineer if degraded ~~shoulders~~ areas are encountered that will not accommodate milled rumble strips. Skip those sections.

A. Test Strip.
Demonstrate to the Engineer on an initial 500 foot (150 m) test section that the equipment and method will provide the desired milled ~~shoulder~~ rumble strip and surface inside each depression without damaging the adjacent pavement. If the desired results are not being provided, as determined by the Engineer, provide different equipment or methods, or make necessary adjustments to provide the desired results. If the initial 500 foot (150 m) section results are unsatisfactory, repair or replace the section as determined by the Engineer, at no additional cost to the Contracting Authority.

B. Milling.

1. Mill shoulder rumble strips in a straight line, offset from the painted edge line as shown in the contract documents. Do not deviate from that offset more than ± 2 inches (50 mm). ~~The offset may be decreased to 6 inches (150 mm) on shoulders with a top width less than 30 inches (750 mm).~~ Ensure the depth of the rumble strips is as shown in the contract documents. The Engineer will randomly check the alignment and depth.

2. Mill centerline rumble strips in a straight line, on the centerline joint as shown in the contract documents. Do not deviate from that location more than ± 1 inch (25 mm). Ensure the depth of the rumble strips is as shown in the contract documents. The Engineer will randomly check the alignment and depth.

~~2~~3. Remove waste material (millings) resulting from the operation on a daily basis. The waste material may be used as fillet material adjacent to the paved shoulder or it may become property of the Contractor and disposed of off the project. Disposal of material may be at an approved landfill or approved stockpile, or by other methods that will allow the material to be recycled. Remove waste material prior to opening adjacent lane to traffic.

C. Asphalt Emulsion Fog Seal.

1. Ensure the equipment meets the requirements of Section 2001.

2. Ensure the application width covers the entire milled shoulder rumble strip.

3. Place the diluted asphalt emulsion fog seal according to Article 2308.03, D, at a rate of 0.13 gallon per square yard (0.6 L/m_2).

4. Do not place asphalt emulsion on a damp or wet surface.

5. Apply asphalt emulsion during weather conditions under which satisfactory application can be obtained. Do not apply asphalt emulsion when the air temperature is below 50°F (10°C). Do not place asphalt emulsion after October 15 without the Engineer's permission.

D. Limitations.
Do not disturb desirable grass areas and desirable trees outside the construction limits. Do not park or service vehicles and equipment or use these areas for storage of materials. Obtain the Engineer's approval for storage, parking, and service areas.

2548.04 METHOD OF MEASUREMENT.
Measurement will be as follows:

A. Milled Shoulder Rumble Strips.
Stations (meters) shown in the contract documents, measured along each edge of mainline pavement ~~abutting a paved shoulder~~. Unless stated otherwise in the contract documents, no deduction will be made for gapped areas. The quantity will be adjusted for the length of degraded shoulders skipped, as defined in Article 2548.03 of this specification. The quantity will be adjusted for test sections that were deemed unsatisfactory.

B. Milled Centerline Rumble Strips.
Stations (meters) shown in the contract documents, measured along the centerline of mainline pavement. Unless stated otherwise in the contract documents, no deduction will be made for gapped areas. The quantity will be adjusted for the length of degraded pavement skipped, as defined in Article 2548.03 of this specification. The quantity will be adjusted for test sections that were deemed unsatisfactory.

~~B~~C. Asphalt Emulsion for Fog Seal (Shoulder Rumble Strips).
Gallons (liters) ~~as provided in Article 2307.04, B~~ computed from field measurements of distributors or from tank cars or transport trucks as provided in Article 4100.03. When quantities computed from field measurements check within 1.0% of the billed gallons (liters), payment will be based on billed gallons (liters). When quantities computed from field measurements differ from billed gallons (liters) by more than 1.0%, payment will be based on the quantity from field measurements. From these quantities, any amount used by the Contractor as fuel, left in cars, or otherwise not delivered to the road surface will be deducted. The Engineer will advise the Contractor promptly, in writing, of quantities deducted.

2548.05 BASIS OF PAYMENT.
Payment will be the contract unit price as follows:

A. Milled Shoulder Rumble Strips.
Per station (meter) for the type specified.

B. Milled Centerline Rumble Strips.
Per station (meter) for the type specified.

~~B~~C. Asphalt Emulsion for Fog Seal (Shoulder Rumble Strips).

1. Per gallon (liter) for undiluted Asphalt Emulsion for Fog Seal (Shoulder Rumble Strips) that is mixed and used on the project. Diluted asphalt emulsion that is delivered to the project site, but not applied to the roadway surface will not be considered for payment.

2. Payment is full compensation for cleaning the shoulder surface, furnishing and applying diluted asphalt emulsion, mixing water, and protecting the adjacent pavement and edge lines.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Melissa Serio	**Office:** Construction	**Item 2**
Submittal Date: June 21, 2010	**Proposed Effective Date:** October 19, 2010	
Article No.: **Title:**	**Other:** DS-09003 Developmental Specifications for Compaction with Moisture Control	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 7/8/2010	**Effective Date:** 10/19/2010

Specification Committee Approved Text: See attached Draft DS for Compaction with Moisture Control.

Comments: The Office of Construction indicated this DS is intended to put responsibility for testing required in Section 2107 on the Contractor. The Districts indicate when they want this applied to projects for personnel staffing reasons. The Specifications Section asked if this specification should be incorporated into the Standard Specifications. District 6 indicated that they would be fine with that. The Committee was not sure how local contracting authorities would be affected. Typically local projects use Compaction with Moisture and Density Control. It was decided to consider incorporating this DS into the Standard Specifications at a future date since Local Systems was not in attendance.

District 6 asked about creating a similar specification for Compaction with Moisture and Density Control for the cases where local entities are designing projects on primary routes. The Office of Construction intends to request approval of a DS for Compaction with Moisture and Density Control in the near future.

The revisions to this DS include restoring language on small quantities from a previous version of this DS. Also, assurance and verification testing has been clarified and made more specific by referring to the applicable Materials I.M.

The Office of Construction requested a small change to the Recommended Text. The words “and verification” were added in Article 09XXX.03, G, 1, a.

Melissa Serio will be the controller for this DS.

Specification Section Recommended Text: See attached Draft DS for Compaction with Moisture Control.

Comments:

Member’s Requested Change: **(Do not use ‘Track Changes’, or ‘Mark-Up’. Use ~~Strikeout~~ and Highlight.)**

See attached Developmental Specifications

Reason for Revision:

1) Language was updated so DS is consistent with Iowa DOT Quality Assurance Program.
2) Frequency of tests has been defined in Materials I.M. 204 (as of October 19, 2010 letting).
3) 09003.03, D, 2, Paragraph added to address testing of areas with small quantities. New wording is similar to what was in DS-01014 but quantities were changed to match current DS and last sentence was added to clarify minimum testing in cases where testing per lift is waived.
4) Other minor updates/corrections.

County or City Input Needed (X one)	**Yes**	**No** X
Comments: None		
Industry Input Needed (X one)	**Yes**	**No** X

Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments: None					

Draft DS-09XXX
(Replaces DS-09003)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
COMPACTION WITH MOISTURE CONTROL

Effective Date
October 19, 2010

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

09XXX.01 DESCRIPTION.
Place and compact embankment materials at the required moisture content as shown in the contract documents. Test and ensure the moisture content of soil being placed is within the specified range.

09XXX.02 MATERIAL.
Soils placed with compaction with moisture control may be select, Class 10, or unsuitable.

09XXX.03 CONSTRUCTION.

A. Quality Control Program (Embankment Construction).

1. Provide and maintain a Quality Control Program (Embankment Construction), defined as all activities of sampling, testing, process control inspection, and necessary adjustments for construction of embankments to meet the requirements of this specification.

2. As part of the Quality Control Program (Embankment Construction), provide a Quality Control Technician to perform testing on all embankment soils placed with Compaction with Moisture Control. As a minimum, the Quality Control Technician shall have a high school education. The Technician shall obtain 'Grade Soils Technician Lab Certification' through a one two day course held at Des Moines Area Community College in Boone through the Technical Training and Certification Program (TTCP) of the Department. Arrange training through the Iowa DOT's Office of Construction (telephone 515.239.1280). TTCP requirements of Materials I.M. 213 apply.

3. Ensure the Quality Control Technician is present on the project when embankment is being placed with Compaction with Moisture Control.

4. Provide laboratory facility and calibrated equipment to perform required tests.

B. Test Procedures.

1. Use test procedures and equipment complying with applicable Materials I.M.'s, Iowa DOT Materials Laboratory Test Methods, or equivalent standards of AASHTO or ASTM.

2. Allow the Engineer to review equivalent standards. Use equivalent standards only if approved by the Engineer.

3. Acceptable test methods for determining moisture content are:
- Oven drying AASHTO T 265
- Pan drying AASHTO T 265 modified to use an open burner
- Microwave ASTM D 4643
- Nuclear gauge Materials I.M. 334

4. Use AASHTO T 265 oven drying method for the reference method for calibration.

~~**5.** Minimum sample size is 1 pound (450 g).~~

C. Embankment Construction.

1. General.
Apply Section 2107 of the Standard Specifications, except when amended by requirements of this specification. Verify embankment placed with moisture control meets the requirements of Article 2107.03, I of the Standard Specifications.

2. Moisture Control.
- **a.** Determine the optimum moisture content by Proctor testing of soil being placed. Determine optimum moisture for each type of excavated or mixed soil which varies as to change the expected AASHTO classification, or if directed by the Engineer.
- **b.** With the Engineer's approval, and for soils that can be identified during excavation, the Contractor may use the optimum moisture content as shown on the soils 'Q' sheets in the contract documents. In lieu of using values from the 'Q' sheets, the Contractor may choose to determine optimum moisture from a field sample.
- **c.** If the Engineer deems the optimum moisture of material being excavated and/or mixed is not represented by that shown on the 'Q' sheets, determine optimum moisture from a field sample.
- **d.** When determined from a field sample at the option of the Contractor or at the Engineer's request, the optimum moisture value from the field sample prevails over that shown on the 'Q' sheets.
- **e.** Test and verify that moisture content of material placed under the item 'Compaction with Moisture Control' is within the optimum range for the soil being placed. Upper and lower control limits for field moisture content of embankment material will be shown in the contract documents.
- **f.** Disk to reduce moisture if, after initial disking to break down lumps greater than 12 inches (0.3 m) as required by Article 2107.03, D, 2, d, of the Standard Specifications, the deposited soil material contains moisture in excess of the specified moisture limits.
- **g.** If, after initial disking as required by Article 2107.03, D, 2, d, of the Standard Specifications, the material is dry to the extent that it is not within the range of the optimum moisture of the soil to allow satisfactory compaction by rolling, uniformly moisten the material to required limits before it is compacted.
- **h.** Proceed with aeration, watering, and compaction operations in an orderly fashion without unreasonable and unnecessary delay. Compensation will not be allowed for delays resulting from the ordering of moistening or disking.
- **i.** Verify soil accepted for final placement is within the specified moisture control limits.

3. Compaction.
Apply Article 2107.03, E, of the Standard Specifications.

4. Equipment.
Apply Article 2107.03, B, of the Standard Specifications, except that for compaction of granular sand soils classified as AASHTO A-1, A-2, or A-3 and having 15% or less combined silt/clay content (percent passing the No. 200 (75 µm sieve) use:

- Pneumatic tired rollers as described in Articles 2001.05, C and 2001.05, D, of the Standard Specifications, or
- Self-propelled vibratory rollers as described in Article 2001.05, F, of the Standard Specifications.

D. Test Frequency during Embankment Construction.

1. ~~Test moisture at a minimum frequency of one test per lift per 1500 feet (450 m) of roadway, for a maximum compacted volume of 1300 cubic yards (1000 m^3).~~ Test for proctor optimum moisture content and embankment moisture content at minimum frequencies in Materials I.M. 204. Samples will be randomly selected.

2. If source of excavation and moisture have been consistent and within moisture control limits, moisture testing of each lift by Article 2107.03, I, of the Standard Specifications will be waived for areas of less than 1300 cubic yards (1000 m^3), or for embankment placed as median dikes (Standard Road Plan RL-4) or safety dikes (Standard Road Plan RL-7). Where testing per lift is waived, test randomly selected samples at a minimum frequency of one test per compacted volume of 1300 cubic yards (1000 m^3).

E. Field Records.

Document all observations, records and inspection, changes in soil type, soil moisture, fill placement procedures, and test results on a weekly basis. Note results of the observations and records of inspection in a permanent field record as they occur. Submit copies of field moisture tests to the Engineer on a weekly basis. Submit original testing records (raw field and lab data sheets) and control charts to the Engineer in a neat and orderly manner within five calendar days after completion of the project.

F. Corrective Action.

Notify Engineer when a moisture content falls outside the specified control limits. If a single moisture content falls outside control limits, fill material in this area will be considered unacceptable for compaction. Perform corrective action(s) to bring uncompacted fill material, after a retest, within specified moisture control limits. If material has been compacted, disk it, bring it to within moisture control limits, and recompact it.

G. ~~Iowa DOT~~ Quality Assurance.

1. Required Testing.

a. The Contractor's Quality Control Technician shall perform all field testing and data analysis. The Quality Control Technician shall retain split samples of Materials I.M. 309 testing when requested by the Engineer. The Engineer may select any or all of the Contractor-retained split samples for independent assurance and verification testing.

b. The Engineer will determine the ~~frequency and~~ random location of ~~assurance~~ verification moisture tests and will test at the minimum frequencies in Materials I.M. 204. The Contractor Quality Control Technician shall obtain a sample at the same location as directed by the Engineer and provide the results to the Engineer. ~~Assurance~~ Verification test results will be provided to the Contractor within one working day after the Contractor's quality control test results have been reported.

c. The Engineer will periodically witness field testing being performed by the Contractor. If the Engineer observes the quality control field tests are not being performed according to the applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will notify the Contractor of observed deficiencies, promptly, both verbally and in writing. The Engineer will document all witnessed testing.

d. All ~~assurance~~ quality control test~~s~~ results become part of the project files.

2. Verification and Independent Assurance Testing ~~Precision~~.

a. ~~Differences between the Contractor's and Engineer's field moisture content tests will be acceptable if moisture content is within 1.5% based on dry weight (mass) of soil. The~~

~~sample for the Engineer's assurance test will be taken from a split sample at the exact location of the Contractor's quality control test.~~ The Contractor's quality control test results will be validated by the Engineer's verification test results using criteria in Materials I.M. 216. If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for material acceptance.

~~**b.** Differences between the Contractor's and Engineer's Proctor compaction results will be acceptable if optimum dry density is within 5 pounds per cubic foot (80 kg/m^3) and optimum moisture is within 1.5% based on dry weight (mass) of soil.~~

~~**c**~~**b.** In the event that ~~comparison test results are outside the above allowable differences~~ the Contractor's results cannot be validated, the Engineer will investigate the reason immediately. The Engineer's investigation may include:

- Testing of other locations,
- Observations of the Contractor's testing procedures and equipment, and
- Comparison of test results of the Contractor with those of the Engineer.

c. Personnel and laboratories performing tests used in the acceptance of material shall participate in the independent assurance program covered in Materials I.M. 205.

3. Referee Testing.

If a difference in procedures for sampling and testing and/or test results exists between the Contractor and the Engineer which they cannot resolve, the Iowa DOT's Central Materials Laboratory ~~or another mutually agreed upon independent testing laboratory~~ will ~~be asked to~~ provide referee testing. The Engineer and the Contractor will abide by the results of the referee testing. ~~The party found in error will pay service charges incurred for referee testing by an independent laboratory.~~

H. Acceptance.

The Engineer will base final acceptance of tests and materials on the results of the Contractor's quality control testing as verified by the Engineer's quality assurance.

09XXX.04 METHOD OF MEASUREMENT.

A. The quantity of embankment requiring Compaction with Moisture Control, in cubic yards (cubic meters), will be the quantity shown in the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture control quantity.

B. All excavation in preparation for and construction of embankment with moisture control will be included in Class 10 Excavation according to Article 2102.04 of the Standard Specifications.

09XXX.05 BASIS OF PAYMENT.

A. Payment for Compaction with Moisture Control will be the contract unit price in cubic yards (cubic meters) for the quantity of embankment placed with moisture control.

B. Payment is full compensation for furnishing a Quality Control Technician, sampling and testing, process control inspection, working of drying material, furnishing and applying water, controlling moisture content of the materials, and compacting the materials, as specified.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Melissa Serio	**Office:** Construction	**Item 3**
Submittal Date: June 18, 2010	**Proposed Effective Date:** October 19, 2010	
Article No.: **Title:**	**Other:** DS-09XXX Developmental Specifications for Moisture and Density Testing for Special Compaction of Subgrade	

Specification Committee Action: Approved with changes.			
Deferred:	**Not Approved:**	**Approved Date:** 7/8/2010	**Effective Date:** 10/19/2010

Specification Committee Approved Text: See attached Draft DS for Moisture and Density Testing for Special Compaction of Subgrade.

Comments: The Office of Construction indicated that this DS is intended to put responsibility for testing required in Section 2109 on the Contractor. This DS will not be used frequently. Special compaction of subgrade is typically used for detours and temporary pavement.

Melissa Serio will be the controller for this DS.

Specification Section Recommended Text: See attached Draft DS for Moisture and Density Testing for Special Compaction of Subgrade.

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**

See attached Developmental Specifications

Reason for Revision: Created DS to provide for contractor QC testing where project has moisture and density requirements as part of Special Compaction of Subgrade.

County or City Input Needed (X one)			**Yes**	**No** X	
Comments: None					
Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments: None					

Draft DS-09XXX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
MOISTURE AND DENSITY TESTING FOR SPECIAL COMPACTION OF SUBGRADE

Effective Date
October 19, 2010

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

09XXX.01 DESCRIPTION.
Test and ensure moisture content and density of material meets requirements of Article 2109.03, C, of the Standard Specifications.

09XXX.02 MATERIAL.
Specified in the contract documents

09XXX.03 CONSTRUCTION.

A. Quality Control

1. Provide Quality Control Technician to perform testing for 'Special Compaction of Subgrade'. As a minimum, Quality Control Technician shall have a high school education. Technician shall obtain 'Soils Technician Lab Certification' through a two day course held at Des Moines Area Community College in Boone through the Technical Training and Certification Program (TTCP) of the Department. Arrange training through the Iowa DOT's Office of Construction (telephone 515.239.1280). TTCP requirements of Materials I.M. 213 apply.

2. Ensure Quality Control Technician is present on project when 'Special Compaction of Subgrade' is being performed.

3. Provide laboratory facility and calibrated equipment to perform required tests.

B. Test Procedures.

1. Use test procedures and equipment complying with applicable Materials I.M.'s, Iowa DOT Materials Laboratory Test Methods, or equivalent AASHTO or ASTM standards.

2. Allow Engineer to review equivalent standards. Use equivalent standards only if approved by the Engineer.

3. Acceptable test methods for determining moisture content and density are:
- Oven drying AASHTO T 265
- Pan drying AASHTO T 265 modified to use an open burner

- Microwave ASTM D 4643
- Nuclear gauge Materials I.M. 334
- Density of soil cores Materials I.M. 326
- Sand Cone Test ASTM D1556

4. Use AASHTO T 265 oven drying method for the reference method for calibration.

C. Moisture and Density Testing

1. Determine optimum moisture content and maximum density by Proctor testing of material being placed and compacted.

2. With Engineer's approval and for material that can be identified during excavation, Contractor may use optimum moisture content and maximum density as shown on soils 'Q' sheets in the contract documents. In lieu of using values from the 'Q' sheets, Contractor may choose to determine optimum moisture and maximum density from field sample.

3. If Engineer deems optimum moisture and maximum density of material is not represented by that shown on 'Q' sheets, determine optimum moisture and maximum density from field sample.

4. When determined from field sample at the option of the Contractor or at the Engineer's request, optimum moisture and maximum density values from field sample prevails over that shown on 'Q' sheets.

5. Test and verify moisture content and density of material placed and compacted meets requirements of Article 2109.03, C, of the Standard Specifications.

D. Test Frequency

Test moisture content, in-place density, proctor optimum moisture content, and maximum density at minimum frequencies in Materials I.M. 204. Samples shall be randomly selected.

E. Field Records.

Document observations, records and inspection, changes in material type, material moisture and density, and test results weekly. Note results of observations and records of inspection in a permanent field record as they occur. Submit copies of field moisture and density tests to the Engineer on a weekly. Submit original testing records (raw field and lab data sheets) and control charts to the Engineer in a neat and orderly manner within five calendar days after completion of project.

F. Corrective Action.

Notify Engineer when moisture content falls outside specified control limits or when density falls below required minimum. If a single moisture content does not meet requirements, subgrade material in this area will be considered unacceptable for compaction. Perform corrective action(s) to bring uncompacted material, after a retest, within specified moisture control limits. If material has been compacted, disk it, bring it to within moisture control limits, and recompact it. If a single density does not meet requirements, subgrade in this area will be considered unacceptable. Perform corrective action(s) to subgrade to meet density requirements.

G. Quality Assurance.

1. Required Testing.

a. Contractor's Quality Control Technician shall perform field testing and data analysis. Quality Control Technician shall retain split samples of Materials I.M. 309 testing when requested by Engineer. Engineer may select any or all of the Contractor-retained split samples for independent assurance and verification testing.

b. Engineer will determine random location of verification tests and will test at the minimum

frequencies in Materials I.M. 204. Contractor's Quality Control Technician shall obtain a sample at the same location as directed by the Engineer and provide results to the Engineer. Verification test results will be provided to the Contractor within one working day after their quality control test results have been reported.

c. Engineer will periodically witness field testing being performed by the Contractor. If the Engineer observes quality control field tests are not being performed according to applicable test procedures, the Engineer may stop production until corrective action is taken. The Engineer will notify the Contractor of observed deficiencies, promptly, both verbally and in writing. The Engineer will document witnessed testing.

d. Quality control test results become part of the project files.

2. Verification and Independent Assurance Precision.

a. The Contractor's quality control test results will be validated by the Engineer's verification test results using criteria in Materials I.M. 216. If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for material acceptance.

b. In the event the Contractor's results cannot be validated, the Engineer will investigate the reason immediately. The Engineer's investigation may include:

- Testing of other locations,
- Observations of the Contractor's testing procedures and equipment, and
- Comparison of test results of the Contractor with those of the Engineer.

c. Personnel and laboratories performing tests used in the acceptance of material shall participate in independent assurance program covered in Materials I.M. 205.

3. Referee Testing.

If a difference in procedures for sampling and testing and/or test results exists between the Contractor and Engineer which they cannot resolve, the Iowa DOT's Central Materials Laboratory will provide referee testing. The Engineer and Contractor shall abide by the results of referee testing.

H. Acceptance.

The Engineer will base final acceptance of tests and materials on results of the Contractor's quality control testing as verified by the Engineer's quality assurance.

09XXX.04 METHOD OF MEASUREMENT.

Work connected with moisture and density testing for Special Compaction of Subgrade will not be measured for payment.

09XXX.05 BASIS OF PAYMENT.

No direct payment will be made for moisture and density testing for Special Compaction of Subgrade, including furnishing a Quality Control Technician, sampling and testing, and process control inspection. The cost of moisture and density testing for Special Compaction of Subgrade is incidental to the contract unit price for Special Compaction of Subgrade.