Florida Department of Transportation

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SECRETARY

January 26, 2010

Monica Gourdine
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 330
Proposed Specification: **3301203 Hot Bituminous Mixtures – General Construction Requirements**.

Dear Ms. Gourdine:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

These changes were proposed by David Wang of the State Construction Office to clarify the Quality Control and Verification Testing processes and measurement acceptance criteria for cross slopes on roadway surfaces for tangent and superelevated sections.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to ST986RP or rudy.powell@dot.state.fl.us.

If you have any questions relating to this specification change, please call Rudy Powell, State Specifications Engineer at 414-4280.

Sincerely,

Rudy Powell, Jr., P.E.
State Specifications Engineer

RP/dt
Attachment
cc: Gregory Jones, Chief Civil Litigation
Florida Transportation Builders' Assoc.
State Construction Engineer

HOT BITUMINOUS MIXTURES – GENERAL CONSTRUCTION REQUIREMENTS.
(REV *1*~~11~~-*26*~~24222~~3-*10*~~09~~)

SUBARTICLE 330-12.3 (of the Supplemental Specifications) is deleted and the following substituted:

330-12.3 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents. Furnish a*n electronic* level with a ~~minimum~~ length of 4 feet *and an accuracy of 0.1 ~~of a~~ degree,* ~~or a digital measuring device~~ approved by the Engineer for the control of cross slope. Make this *electronic* level ~~or measuring device~~ available at the jobsite at all times during paving operations. ~~Utilize electronic transverse screed controls on the paving machine (unless directed otherwise by the Engineer) to obtain an accurate transverse slope of the pavement surface.~~

330-12.3.1 Quality Control Requirements: *Calibrate the electronic levels a minimum of once per day before any paving operation, in accordance with manufacturer's instructions.*

~~In addition,~~ C~~c~~ompare the Quality Control level with the Verification level before any paving operation, and at any time directed by the Engineer.

If the comparison between the Quality Control and Verification levels is within the comparison tolerance of plus or minus 0.2%, the Quality Control level is considered to compare favorably and can be used for measurement and acceptance of cross slopes. ~~-~~If the levels do not compare favorably, perform a second comparison using another calibrated electronic level (FDOT or Contractor) for resolution ~~level~~. If this resolution~~the second~~ level compares favorably with the Quality Control level, the Quality Control level is considered to be verified. If the second level does not compare favorably with the Quality Control level, discontinue the use of the Quality Control electronic level and ~~take actions to~~ obtain another approved electronic level that meets the requirements of this specification. Regardless of the comparison analysis outcome, the Contractor assumes all risk associated with placing the pavement at the correct cross slope.

Measure the cross slope of the *compacted~~completed~~* pavement surface by placing the ~~measuring device~~ *level at the center location of a lane and* perpendicular to the roadway centerline. ~~Report the cross slope to the nearest 0.1%.~~ Record all the measurements *to the nearest 0.1%* on an approved form and submit to the Engineer for documentation.

~~Measure the cross slope at a minimum frequency of one measurement every 100 feet during paving operations to ensure that the cross slope is uniform and in compliance with the design cross slope. When the difference between the measured cross slope and the design cross slope exceeds ±0.2% for travel lanes (including turn lanes) or ±0.5% for shoulders, make all corrections immediately to bring the cross slope into the acceptable range.~~

1. Tangent Sections: Measure the cross slope per lane at a minimum frequency of one measurement every 100 feet. Calculate the absolute deviation of~~average~~ cross slope at~~of~~ each ~~ten consecutive~~ measurement~~s~~ and then ~~calculate the~~ average ~~of~~ the absolute deviation of ten consecutive cross slope measurements ~~of ten~~

~~consecutive measurements~~. The absolute deviation is the positive value of a deviation.~~———————~~ When the average absolute deviation cross slope is consistently within the accepta*nce*~~ble range~~ tolerance as shown in Table 330-2 and upon the approval of the Engineer, the frequency of the cross slope measurements can be reduced to one measurement every ~~250~~ 200 ~~-~~feet during paving operations.

2. Superelevated Sections: Measure the cross slope every 100 feet per lane within the length of full superelevation. ~~and~~ C~~c~~alculate the ~~average~~ absolute deviation of each measurement and then average the absolute deviation of ten consecutive cross slope measurements. For every transition section, m~~M~~easure the cross slope at control points identified in the plans, or if not shown in the plans, at a control point at the location of 0.0% cross slope and calculate the absolute deviation~~of every transition section~~. For curves where the length of full superelevation is less than 250 feet, measure the cross slope at the beginning point, midpoint and ending point of the fully superelevated sections, calculate the absolute deviation, and ~~. cCalculate the~~ average ~~absolute deviation of these three cross slopes~~.~~ten consecutive cross slope measurements when the number of measurements is more than ten or the average absolute deviation of all the measurement~~, W~~w~~hen the number of measurements is less than ten and the length of full superelevation is greater than 250 feet, ~~calculate the~~ average the absolute deviation~~cross slope~~ of all measurements.~~ Construct the superelevation and the transitions with lane rotation in accordance with the requirements of the Contract Documents.~~

If the average absolute deviation of the cross slope measurements falls outside the acceptance tolerance, as shown in Table 330-2, stop the paving operations and make adjustments until the problem is resolved to the satisfaction of the Engineer. If an individual cross slope deviation falls outside the acceptance tolerance as shown in Table 330-2, make corrections in accordance with 330-12.5 only to cover the deficient area for the structural course at no cost to the Department. For pavement with multiple layers, the deficient areas for the structural course may be ~~allowed to be~~ left in place, upon the approval of the Engineer. Complete ~~All~~ corrections ~~shall be completed~~ before placement of the final design surface layer (Type SP layer or friction course layer), unless stated otherwise in the plans, or as determined by the Engineer. For friction course layers, make corrections in accordance with 330-12.5.

The limits of deficient areas requiring correction may be verified and adjusted with more accurate measurement methods, including survey instruments, upon approval by the Engineer at no cost to the Department.

Should the Contractor wish to have any corrections waived, submit a request to the Engineer for approval. The Engineer may waive the corrections at no reduction in payment if~~:~~ the deficiencies are sufficiently separated so as not to affect the overall traffic safety, surface drainage and ride quality characteristics of the pavement and the corrective action would unnecessarily mar the appearance of the finished pavement.

~~———————— 1) The deficiencies are sufficiently separated so as not to affect the overall ride quality, traffic safety and surface drainage characteristics of the pavement and;~~

~~———————— 2) The corrective action would unnecessarily mar the appearance of the finished pavement.~~

For intersections, tapers, crossovers, transitions at the beginning and end of the project, bridge approaches and similar areas, adjust the cross slope to match the actual site conditions, or as directed by the Engineer.

Table 330-2 *Cross Slope Acceptance Tolerance*		
Roadway Feature	*Individual Absolute Deviation*	*Average Absolute Deviation*
Tangent section (including turn lanes)	± *0.4%*	± *0.2%*
Superelevated curve ~~*(unless the design tolerance is shown in the plans)*~~	± *0.4%*	± *0.2%*
Shoulder	± *0.5%*	± *0.5%*
~~*Note:*~~ ~~*In the event that the distance between two edges of deficient areas is less than 100 feet, the correction work shall include the area between deficient sections.*~~		

In the event that the distance between two edges of deficient areas is less than 100 feet, the correction work shall include the area between the deficient sections.

330-12.3.2 Verification: The Engineer will verify the Contractor's cross slope measurements by randomly taking a minimum of ten *cross slope* measurements ~~of the cross slope~~ *per lane per mile i*~~*o*~~*n tangent sections, control points in transition sections, and a minimum of three cross slope measurements on fully super*~~*-*~~*elevated sections* over a day's production. -*The Engineer will m*~~*M*~~*easure the cross slope of the compacted pavement surface by placing the level at the center location of a lane and perpendicular to the roadway centerline.* If the average *absolute deviation or an individual* cross slope *deviation falls outside of* ~~of the ten random measurements varies more than~~ the ~~allowable~~ *acceptance* tolerance ~~from the design cross slope~~ *as shown in Table 330-2* ~~(0.2% for travel lanes including turn lanes and 0.5% for shoulders)~~, *immediately make a comparison check at the QC test locations to verify the QC measurements in the questionable section. If the comparisons are beyond the acceptable comparison tolerance in accordance with 330-12.3.1* ~~take immediate action to bring the cross slope into the acceptable range. A recheck of the cross slope will then be made following the adjustment. If the recheck indicates that the cross slope is still out of tolerance~~, stop the paving operations *until the problem is resolved to the satisfaction of the Engineer.* ~~and correct~~*Correct any cross slope not meeting the individual deviation acceptance tolerance* ~~deficient section~~ in accordance with 330-12.5~~.1.~~ *at no cost to the Department.* ~~Resume paving operations only upon approval of the Engineer.~~ The Engineer reserves the right to *check*~~verify~~ the pavement cross slope at any time by taking cross slope measurements *at any location* ~~as described above~~.

~~The Engineer may waive the corrections specified above (at no reduction in payment) if:~~

~~1) the deficiencies are sufficiently separated so as not to affect the overall ride quality, traffic safety and surface drainage characteristics of the pavement and;~~

~~2) the corrective action would unnecessarily mar the appearance of the finished pavement.~~

~~For intersections, tapers, crossovers, transitions at beginning and end of project and similar areas, adjust the cross slope to match the actual site conditions or as directed by the Engineer.~~

HOT BITUMINOUS MIXTURES – GENERAL CONSTRUCTION REQUIREMENTS.
(REV 1-26-10)

SUBARTICLE 330-12.3 (of the Supplemental Specifications) is deleted and the following substituted:

330-12.3 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents. Furnish an electronic level with a length of 4 feet and an accuracy of 0.1 degree, approved by the Engineer for the control of cross slope. Make this electronic level available at the jobsite at all times during paving operations.

330-12.3.1 Quality Control Requirements: Calibrate the electronic levels a minimum of once per day before any paving operation, in accordance with manufacturer's instructions.

Compare the Quality Control level with the Verification level before any paving operation, and at any time directed by the Engineer. If the comparison between the Quality Control and Verification levels is within the comparison tolerance of plus or minus 0.2%, the Quality Control level is considered to compare favorably and can be used for measurement and acceptance of cross slopes. If the levels do not compare favorably, perform a second comparison using another calibrated electronic level (FDOT or Contractor) for resolution. If this resolution level compares favorably with the Quality Control level, the Quality Control level is considered to be verified. If the second level does not compare favorably with the Quality Control level, discontinue the use of the Quality Control electronic level and obtain another approved electronic level that meets the requirements of this specification. Regardless of the comparison analysis outcome, the Contractor assumes all risk associated with placing the pavement at the correct cross slope.

Measure the cross slope of the compacted pavement surface by placing the level at the center location of a lane and perpendicular to the roadway centerline. Record all the measurements to the nearest 0.1% on an approved form and submit to the Engineer for documentation.

1. Tangent Sections: Measure the cross slope per lane at a minimum frequency of one measurement every 100 feet. Calculate the absolute deviation of cross slope at each measurement and then average the absolute deviation of ten consecutive cross slope measurements. The absolute deviation is the positive value of a deviation. When the average absolute deviation cross slope is consistently within the acceptance tolerance as shown in Table 330-2 and upon the approval of the Engineer, the frequency of the cross slope measurements can be reduced to one measurement every 200 feet during paving operations.

2. Superelevated Sections: Measure the cross slope every 100 feet per lane within the length of full superelevation. Calculate the absolute deviation of each measurement and then average the absolute deviation of ten consecutive cross slope measurements. For every transition section, measure the cross slope at control points identified in the plans, or if not shown in the plans, at a control point at the location of 0.0% cross slope and calculate the absolute deviation. For curves where the

length of full superelevation is less than 250 feet, measure the cross slope at the beginning point, midpoint and ending point of the fully superelevated sections, calculate the absolute deviation, and average . When the number of measurements is less than ten and the length of full superelevation is greater than 250 feet, average the absolute deviation of all measurements.

If the average absolute deviation of the cross slope measurements falls outside the acceptance tolerance, as shown in Table 330-2, stop the paving operations and make adjustments until the problem is resolved to the satisfaction of the Engineer. If an individual cross slope deviation falls outside the acceptance tolerance as shown in Table 330-2, make corrections in accordance with 330-12.5 only to cover the deficient area for the structural course at no cost to the Department. For pavement with multiple layers, the deficient areas for the structural course may be left in place, upon the approval of the Engineer. Complete corrections before placement of the final design surface layer (Type SP layer or friction course layer), unless stated otherwise in the plans, or as determined by the Engineer. For friction course layers, make corrections in accordance with 330-12.5.

The limits of deficient areas requiring correction may be verified and adjusted with more accurate measurement methods, including survey instruments, upon approval by the Engineer at no cost to the Department.

Should the Contractor wish to have any corrections waived, submit a request to the Engineer for approval. The Engineer may waive the corrections at no reduction in payment if the deficiencies are sufficiently separated so as not to affect the overall traffic safety, surface drainage and ride quality characteristics of the pavement and the corrective action would unnecessarily mar the appearance of the finished pavement.

For intersections, tapers, crossovers, transitions at the beginning and end of the project, bridge approaches and similar areas, adjust the cross slope to match the actual site conditions, or as directed by the Engineer.

Table 330-2
Cross Slope Acceptance Tolerance

Roadway Feature	Individual Absolute Deviation	Average Absolute Deviation
Tangent section (including turn lanes)	0.4%	0.2%
Superelevated curve	0.4%	0.2%
Shoulder	0.5%	0.5%

In the event that the distance between two edges of deficient areas is less than 100 feet, the correction work shall include the area between the deficient sections.

330-12.3.2 Verification: The Engineer will verify the Contractor's cross slope measurements by randomly taking a minimum of ten cross slope measurements per lane per mile in tangent sections, control points in transition sections, and a minimum of three cross slope measurements on fully superelevated sections over a day's production. The Engineer will measure the cross slope of the compacted pavement surface by placing the level at the center location of a lane and perpendicular to the roadway centerline. If

the average absolute deviation or an individual cross slope deviation falls outside of the acceptance tolerance as shown in Table 330-2, immediately make a comparison check at the QC test locations to verify the QC measurements in the questionable section. If the comparisons are beyond the acceptable comparison tolerance in accordance with 330-12.3.1, stop the paving operations until the problem is resolved to the satisfaction of the Engineer. Correct any cross slope not meeting the individual deviation acceptance tolerance in accordance with 330-12.5 at no cost to the Department. The Engineer reserves the right to check the pavement cross slope at any time by taking cross slope measurements at any location.