

3301203 HOT BITUMINOUS MIXTURES – GENERAL CONSTRUCTION
REQUIREMENTS
RESPONSE TO INTERNAL/INDUSTRY REVIEW COMMENTS

Jim Warren
jwarren@acaf.org

Comment: (Internal Review comment 11-25-09)

1. The following language is in the QC section 330-12.3.1 but should also be in the VT sections 330-12.3.2 "Measure the cross slope of the completed pavement surface by placing the measuring device level at the center location of a lane and perpendicular to the roadway centerline" We discussed this in detail at the task team meeting. We all discussed wanting everyone to use the same length level and test in the same location on the roadway to ensure we would have a good chance of comparing QC to VT.
2. The language in 330-12.3.2 now states: The Engineer reserves the right to verify the pavement cross slope at any time by taking cross slope measurements at any locations. I don't recall having this conversation. We need to stay consistent and this last sentence should be replaced with the one in 12.3.1 above.

Response:

1. I agree with your comment. The Specification will be revised as follows:

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 mile on tangent sections and a minimum of three cross slope measurements on fully super-elevated sections* **over a day's production**. *Measure the cross slope of the completed pavement surface by placing the level at the center location of a lane and perpendicular to the roadway centerline.*

(see response to comment from Chris Papastratis (last comment) – "one day's production" will not be deleted.)

2. Generally, this sentence is always included in the Specifications in addition to the QC and VT operations, it is used at any construction operations such as roadway, bridge etc.. The sentence will be revised as follows:

The Engineer reserves the right to ~~verify~~ check the pavement cross slope at any time by taking cross slope measurements at any locations.

Dan Cooney
Ranger Construction
561-784-3488
Dan.Cooney@rangerconstruction.com

Comments: (Internal Review comment 11-30-09)

Before responding to the proposed specification change I would like to convey a few points:

1. Intent of cross slope specification – The intent of the cross slope specification as I understand is three fold a) ride quality b) traffic safety and c) surface drainage. The specified cross slopes as per plans or design standards target a cross slope that should yield a smooth ride, drain certain water levels and in super elevated sections allow automobiles to maintain speeds without leaving the pavement surface.

I would think the engineers have built in a certain tolerance in order to meet the intentions of the specification. I would like to know what tolerances were “built in” if any and if there were not tolerances built in then maybe the target / design slopes should be changed in order to help ensure the minimum without having the restrictions on the asphalt pavement so stringent contractors would have difficulties in building and maintaining the desired cross slopes.

Response:

The proposed specifications are for the QC and VT operations for the cross slope construction, not for the design. Many factors must be considered for the roadway cross slope design. Once the Plans provide the design cross slope, the cross slopes of the pavement shall be built to meet the acceptance tolerance specified by this construction specifications.

No changes made.

2. Many projects do not give enough information for the existing grades in the super elevated section of the plan details to know what would be required to correct cross slope. The Department would need to give detailed information concerning the existing conditions of the super elevated sections and engineering direction and quantities in order to know how to bid the work and construct the project.

Response:

The plans should provide all information need to construct the project. If the information shown in the plans for the cross slope adjustment is not enough, submit a question in prior to bidding on the project.

No change for the proposed specs.

3. Existing conditions – The asphalt pavement seems to be the “fix all” to all problems. Existing grades of structures, catch basins, curb and gutter etc. make it impossible to match curb line and maintain proper cross slopes.

New construction does not have tolerances for the cross slope of the base material or strict tolerances for grade control on curb and gutter. In order for contractors to construct and maintain specified cross slopes with asphalt maybe the Department would be better served to change specifications dealing with the rock base and grade controls of structures and curb and gutter.

Response:

The plans should provide all information need to construct the project. If the information shown in the plans for the cross slope adjustment is not enough, submit a question in prior to bidding on the project.

If needed, specifications dealing with rock base and grade controls of structures and curb and gutter, will be reviewed and addressed in a future revision. No change for the proposed specs.

330-12.3.1 Quality Control Requirements

1. Sixth paragraph, number 2, fifth sentence: Super elevated Sections Construct the super elevation and the transitions with lane rotation in accordance with the requirements of the Contract Documents.

Comment: There needs to be enough engineering information including quantities from the Department in order for the contractor to do so.

Response:

The plans should provide all information need to construct the project. If the information shown in the plans for the cross slope adjustment is not enough, submit a question in prior to bidding on the project. The sentence *“Construct the superelvation and the transitions with lane rotation in accordance the requirements of the Contract Documents.”* is deleted because all information is shown in the plans.

No change for the proposed specs.

2. Seventh paragraph, second to last sentence: all corrections shall be completed before placement of the final design surface layer, unless otherwise stated in the plans or as determined by the Engineer –

Comment: If friction course is to be dense graded (with a structural value) allow for corrections to be made with the friction course. Any deficiencies with the friction course would then be corrected in accordance with 330-12.5

Response:

In order to maintain the quality of the pavement smoothness of the friction course, it is desirable to make all the corrections before the placement of the final layer. No change of the proposed specifications.

3. Ninth paragraph, first sentence: should the Contractor wish to have any correction waived, submit a request to the Engineer for approval.

Comment: While the proposed specification change allows for the possible correction waiver under set guidelines many CEIs and Engineers are reluctant or not comfortable to grant waivers. They do not want to make “engineering” decisions. Such requests should be brought before a panel or committee with enough expertise to adequately respond to the request.

Response:

If the Engineer at the job site does not make “engineering” decisions, the Resident Engineer or DCE shall be informed to resolve the issue. No change.

4. Paragraph 10: For intersections, tapers, crossovers, transitions at the beginning and the 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.

Comment: There are numerous conditions that would warrant matching the actual site conditions including but not limiting to the aforementioned curb and gutter and catch basin scenarios

Response:

Curb and gutter and catch basin scenarios will be addressed in the plans. This sentence addresses transitions between new and existing. No change for the proposed specifications.

5. Table 330-2

Roadway Feature	Individual 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%	± actual site conditions, or as directed by the Engineer. 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.		

Comment:

- a. Increase the average absolute deviation from 0.2% to 0.3%
- b. Increase the Individual Deviation from 0.4% to 0.5%
- c. The Individual Deviation for Shoulders should be greater than the average absolute deviation.
- d. Increase the Individual Deviation from 0.5 to 0.7 on shoulders

Response:

The Table has been discussed and reviewed in detail and concluded during the cross slope specifications development Committee including the representatives from FDOT and Contractors. No change for the tolerance in the Table.

Jim Mills/David O'Hagan
 414-4318 / 414-4283
jim.mills@dot.state.fl.us

Comments: (Internal Review comment 12-8-09) (Industry Review O'Hagan – 12-11-09)

- 1. Section 330-12-3.1: Rewrite the paragraph beginning with “Should the Contractor wish to have any corrections waive...” to eliminate the numbering. There are three different conditions addressed under number 1 and only one condition addressed under number 2. This

inappropriately implies that number 2 (appearance) carries as much weight alone as all three of the items under number 1 (ride, safety, and drainage). If anything, Safety should be number 1 among all these items. Safety, ride and drainage should be retained, but consider eliminating number 2 (appearance) altogether.

Response:

The paragraph will be revised as follows:

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.

2. Table 330-2: Under “Superelevated curve”, please delete the phrase “(unless the design tolerance is shown in the plans)”. This phrase is not necessary since, even without this phrase, a different tolerance could be included in the plans that would override the spec. Furthermore, this specification should address “construction” tolerances only without mention of “design” tolerances, which will only lead to questions of interpretation and confusion. It will be very unusual for a designer to include a construction or design tolerance for superelevation in the plans.

Response: Agree with the comment. The phrase will be deleted.

3. Except for the above comments, the proposed changes will be a significant improvement.

Response: Thank you for the comments.

Donnie Autry
donnie@lhlsafety.com

Comments: (12-11-09)

Both (3270300 and 3301203) of these proposed specification changes are difficult to understand. How may roadway technicians know the meaning of *average absolute deviation* much less how to calculate it? This makes a difficult task more difficult.

Response:

The specification 330-12.3.1 will be revised to provide the method of calculation of the average absolute deviation as follows:

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

Christopher NeSmith
407-264-3482
christopher.nesmith@dot.state.fl.us

Comments: (12-14-09)

In 330-12.3.2, the comparison really needs to say: "If the comparisons are beyond the acceptable comparison tolerance according to 330-12.3.1..." This will help clarify if someone is only reading the verification section of this Specification.

Response: Agree with your comment. The sentence will be revised as follows:
If the comparisons are beyond the acceptable comparison tolerance according to 330-12.3.1,...

Howie Moseley
386-961-7853
howard.moseley@dot.state.fl.us

Comments: (12-18-09)

Table 330-2: Can the average absolute deviation in Table 330-2 be a negative number? Aren't all absolute numbers positive? You may want to provide guidance somewhere on how to calculate the average absolute deviation.

Response: The paragraph will be revised as follows:

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

Christopher Wood
(904) 360-5673
Christopher.Wood@dot.state.fl.us

Comments: (12-30-09)

1) 330-12.3.1 states that QC shall measure the cross slope of the "completed" pavement surface. If we wait until it is completed in the summer it could be up to an hour or more behind the

paver due to the high temperatures. Then later in the spec it says that if you find a cross slope reading that is out you should make “immediate” corrections well as noted above this could be an hour or more after the fact if this the intent.

Response: The “completed” will be changed to “compacted”.

2) We should include some verbiage stating that if the contractor wishes to delineate areas by means of a survey this should be done at no expense to the department.

Response: Agree with the comment. The sentence will be revised as follows:

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 and the operations should be done at no cost to the Department.

3) In specification 330-12.3.2 why are we only checking or verifying fully super elevated sections? Shouldn't we be checking transition slope and length also?

Response: The paragraph will be revised as follows:

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 on tangent sections, control points and a minimum of three cross slope measurements on fully super-elevated sections over a day's production.

4) Rather than saying that the electronic level should be approved by the engineer, why not specify what the acceptance criteria for the electronic level should be? Otherwise, what should the engineer accept or reject? Should it be based on the Tolerance of the level being less than the Individual Deviation Tolerance?

Response: Agree. The accuracy is provided in the spec.

5) The new specification indicates the use of the “average absolute deviation” numerous times. The absolute average deviation needs to be clarified. Maybe in the table show how the absolute average deviation is calculated with an example.

Response: See the previous response.

Rudy Powell
414-4280

Comments: (1-5-10)

1. 330-12.3: It is not clear if the contractor provides and calibrates the QC level only or both the QC and verification levels.

Response: The CQC Specifications are written in active voice to specified the responsibilities of the QC operations. The duties and responsibilities of VT will be specified in CPAM and SMO Testing Manual. The QC level is provided by the Contractor and the VT level is provided by the Engineer.

2. 330-12.3.1: The comparison tolerance between the QC and verification levels is the same as the absolute average deviation. Is that correct? It seem the comparison tolerance would need to be tighter. For instance, if the plans show a 2% cross slope, the QC level may read 1.8% which is within tolerance but the verification level may read 1.6% which is out of tolerance but the levels compare to each other.

Response: The VT reading is compared to QC reading only.

3. 330-12.3.1: If the levels don't compare, is the QC or verification level not used? Which one is assumed to be correct?

Response: Language changed to clarify the use of a resolution level.

4. 330-12.3.2: Is the number of measurements per lane?

Response: The sentence will be revised :

The Engineer will verify the Contractor's cross slope measurements by randomly taking a minimum of ten *cross slope* measurements *per lane* ~~of the cross slope~~ *per mile on tangent sections and a minimum of three cross slope measurements on fully super-elevated sections* ~~over a day's production.~~

5. 330-13.3.2: If the verification measurements don't meet the acceptance tolerances then a comparison check is made at the QC check locations. What is being compared? Also, if the comparison at the QC locations is ok then what happens at the verifications locations that were not ok?

Response: As far as the QC measurements are verified and within the acceptance tolerance, we will accept the contractor's QC records as the final cross slopes. The verification location with failed cross slope, the individual absolute deviation tolerance in Table 330-2 shall be followed.

6. Table 330-2: The note needs to be moved into the text.

Response: Agree.

Christopher Wood
904-360-5673
Christopher.Wood@dot.state.fl.us

Comments: (1-8-10)

1. Throughout this revision reference is made to the average absolute deviation. It needs to be clearly defined as to how to calculate the average absolute deviation.

Response:

1. The specification 330-12.3.1 will be revised to provide the method of calculation of the average absolute deviation as follows:

*Tangent Sections: Measure the cross slope per lane at a minimum frequency of one measurement every 100 feet. Calculate the ~~average~~ absolute deviation of ~~cross slope~~ at ~~of~~ each ~~ten~~ measurement and then calculate the average of the absolute deviation cross slope 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 ~~acceptable 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. 330-12.3.1

- a. the paragraph for tangent sections it states that” measure the cross slope per lane at a minimum frequency of one measurement every 100 feet. Calculate the average cross slope of ten consecutive measurements.” Do we take the average of the ten cross slopes or the average absolute deviation of the ten cross slopes?
- b. This frequency of ten measurements every 100 feet will get us 1000 feet down the road. What do we do for the rest of the days production?
- c. The paragraph for the superelevated sections is very confusing. Can you do away with several of the run on sentences?
- d. What is meant by “Construct the superelevation and transitions with lane rotation in accordance with the requirements of the contract documents.” Can you have a superelevation transition without a lane rotation?
- e. It is not clear in this 330-12.3.1 spec what to do for the whole days production. It appears that we will check the first 1000 feet and analyze these results. Do we take the average absolute deviation for each 1000 foot section for the balance of the days production? Does this apply to the tangent sections and the long superelevated sections? Please clarify.

2.

- a. The specifications will be revised as Response 1.
- b. The measurements continue every 100’ with an average every 10 measurement.
- c. The paragraph will be revised as follows:
 2. Superelevated Sections: Measure the cross slope every 100 feet per lane within the length of full superelevation and calculate the average absolute deviation of ten consecutive cross slope measurements. For every transition section, measure ~~Measure~~ the cross slope at control points identified in the plans or at a control point at the location of 0.0% cross slope ~~of every transition section~~. For curves where the length of full superelevation is less than 250 feet, only measure the cross slope at the beginning point, midpoint and ending point of the fully superelevated sections and calculate the average

absolute deviation of these three cross slopes. Calculate the average absolute deviation of ten consecutive cross slope measurements. When when the number of measurements is more than ten or the average absolute deviation of all the measurement, When when the number of measurements is less than ten and the length of full superelevation is greater than 250 feet , calculate the average absolute cross slope of all measurements. Construct the superelevation and the transitions with lane rotation in accordance with the requirements of the Contract Documents.

d. Sentence has been deleted.

e. See response to “a” above.

3. In table 330-2 if the individual deviation of the shoulders an individual deviation of (+-).5% is the average deviation of (+-).5% correct?

Response: The Table 330-2 will be revised as follows:

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.		

Chris Papastratis
954-777-4193
chris.papastratis@dot.state.fl.us

Comments: (1-8-10)

1. The revised Spec has added the word “completed” to the word pavement in Section 330-12.3.1. My understanding from the addition of this word is that the cross slopes measurements wouldn’t be taken until the rolling operations were done. As long as this was the intent, it should be fine to leave as is. Basically, we are not sure what you mean by completed pavement.

Response: “Completed” has been changed to “compacted” for clarification.

2. In Section 330-12.3.2 the revised Spec indicates that the Verification Technician is to take ten cross slopes per mile in a tangent section but has removed the statement discussing “per day’s production”. They may want to include verbiage requiring ten (or some other number) measurements per day’s production as a minimum when you are making shorter pulls. We request “per day’s production” to not be removed.

Response: Agree. “Per day’s production” will not be deleted.
