3270300 MILLING OF EXISTING ASPHALT PAVEMENT – CONSTRUCTION
RESPONSES TO INTERNAL/INDUSTRY REVIEW COMMENTS
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Jim Warren
jwarren@acaf.org

Comment: (Internal Review 11-25-09)

1: Same comment as for 330 spec regarding cross slope. We need to (?) all (QC/VT) measuring at the same location on the roadway.
The following language is in the QC section 327-3.2 but should also be in the VT sections 327-13.2 "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 327-3.2 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 13.2 above.

Response:
1. Agree with your comments. The Spec. will be revised as follows:

327-3.3 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 on tangent sections, control points, and a minimum of three cross slope measurements on fully superelevated sections over a day's production. Measure the cross slope of the milled 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 the acceptance tolerance from the designed milling cross slope as shown in Table 327-1, 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 milling operation until the problem is resolved to the satisfaction of the Engineer. Correct any cross slope not meeting the individual deviation acceptance tolerance at no cost to the Department. The Engineer reserves the right to check the cross slope of the milled surface at any time by taking cross slope measurements at any location.

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 *of the milled surface* at any time by taking cross slope measurements at any locations.

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

Comments: (Internal Review 12-8-09) (David O'Hagan 12-11-09)

1. Table 327-1: 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. (David O'Hagan – I hope this revision will be made.)

2. Except for the above comment, the proposed changes will be a significant improvement.

Response:
1. Agree with your comment. The phrase has been deleted.

2. Thank you for your comment.

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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:
1. The spec will be revised as follows:

> 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 calculate the average of the absolute deviation cross slope of ten consecutive measurements. The absolute deviation is the positive value of a deviation.~~ Calculate the absolute deviation of cross slope at each 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 tolerance as shown in Table 327-1 and upon approval by the Engineer, the frequency of the cross slope measurements can be reduced to one measurement every 200 feet during milling operations.

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

Comments: (12-14-09)

1. In the Verification section, I think if an individual verification cross slope measurement falls outside the acceptance tolerances as shown in Table 327-1, the QC and VT should perform a comparison at that location. If the average absolute deviation of the verification measurements falls outside the acceptance tolerances as shown in Table 327-1 then the QC and VT should perform a comparison in that section (in this case do you select on location or test ten locations?).
2. Also, the comparison could be clarified. The wording says "If the comparison is outside the acceptance tolerance..." I think this comparison is refering to the difference between the QC reading and the Verification reading. But there is no criteria for comparing two devices in the acceptance tolerance table. There needs to be a comparison criteria or clarification on how to determine if the comparison is outside the acceptance criteria.
3. Also, if the intent is to have the Verification and QC measure a location and determine the difference between the two devices, then the word "comparison" should be replaced by the words "difference between the two devices."

Response: Agree with your comments. The specifications will be revised as follows:

327-3.3 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 on tangent sections, control points, and a minimum of three cross slope measurements on fully superelevated sections over a day's production. Measure the cross slope of the milled 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 the acceptance tolerance from the designed milling cross slope as shown in Table 327-1, 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 milling operation until the problem is resolved to the satisfaction of the Engineer. Correct any cross slope not meeting the individual deviation acceptance tolerance at no cost to the Department. The Engineer reserves the right to check the cross slope of the milled surface at any time by taking cross slope measurements at any location.

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

Comments: (12-14-09)

1. This is my second comment on section 327. Now that I read the changes to 330, I see a difference between the Verification and Comparison between the Verification and QC devices.

The verification section in 327 needs to read more like the new Verification section in 330-12.3.2.

2. Also, 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 327 because when you read 327 there is no reference to the definition of acceptable critera and it almost looks as though you need to look at the acceptable criteria table.

Response:
1. Agree. Please see the previous responses.

2. Agree. Please see the previous responses.

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Bob Dion
386-740-0665
bob_dion@urscorp.com

Comments: (12-14-09)
Suggest you move the last 7 paragraphs of 327-3.3 Verification (beginning with "Operate the milling machine to minimize the amount of dust...") to 327-3.1 General.

Response:
1. Agree. Text will be moved to 327-3.1 General.

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

Comments: (12-18-09)
Table 327-1: Can the average absolute deviation in Table 327-1 be a negative number since it is an absolute number (Aren't absolute numbers always positive?)? You may want to look into this and possibly provide guidance on how to calculate this value.

Response:
1. Agree. Please see response to Donne Autry.

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

Comments: (12-30-09)

1) 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.

2) Include a requirement that QC provide an electronic level capable of measurements to the nearest 0.1%.

Response:
1. Agree. Please see response to Donne Autry.

2. Required accuracy of the electronic level will be added in the spec.

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Stefanie Maxwell
850-414-4314, Fax: 850-412-8021
stefanie.maxwell@dot.state.fl.us

Comment:
327-3.2 Quality Control Requirements: It appears that the font is smaller in the last two paragraphs, just above the table. Also, there are two subarticles numbered 327-3.2. It appears that 327-3.2 Verification should be renumbered to 327-3.3 Verfication.

Response: (1-5-10)
From the Specifications Office: These changes have been made.

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Rudy Powell
414-4280

Comment: (1-5-10)
1. 327-3.2 It is not clear if the contractor provides and calibrates the QC level only or both the QC and verification levels.
2. 327-3.3 Is the number of measurements per lane?
3. 327-3.2 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?
4. Table 327-1 The note needs to be moved into the text.

Response:
1. The CQC Specifications are written in active voice to specify the responsibilities of the QC operations. The duties and responsibilities of VT will be specified in CPAM and SMO Testing Manual.

2. Yes. The spec. will be revised as follows:

327-3.3 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 on tangent sections and a minimum of three cross slope measurements on fully superelevated sections*…..

3. If the second calibrated level compares favorably with the Contractors, the Contractor's level is considered acceptable.

4. Agree. Change has been made.

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John Danello, Jr.
Turtle Southeast, Inc.
727-518-0962
j.danello@turtlese.com

Comment: (1-5-10)
We have reviewed the proposed specification change and feel that there should be some additional factors taken into consideration. The fourth paragraph of the proposed change, states that "If an individual cross slope deviation falls outside the acceptance tolerance as shown in Table 327-1, make corrections only in the deficient area to the satisfaction of the Engineer at no cost to the Department". After review we determined that the length of the deficient area and existing conditions should be taken into consideration. Preexisting conditions may have been the main factor in the deficiency. We feel that any individual deficiency should require additional measurements to establish the true nature of the deficiency.

A possible solution to this may be to take two additional measurements within 25' either side of the deficient area and then take an absolute average of the three measurements to see if they meet the specified requirements of table 327-1. This will help to better define the area that is out of individual tolerance and allow a proper correction if necessary. As you are aware paver and mills are required to utilize an automatic grade control system, these systems are designed to average out grade and slope deviations over a specified length. It has been our experience that averaging these areas out and allowing the grade control systems to function to the capacity that they were designed, this will not only provide a better riding surface but a more consistent milling and paving yield.

We also believe there should be some kind of provision in the specification that allows for leaving areas that are too low in place. For instance if there is an area that has settled and a cross slope check is performed in this area, it would more than likely show the cross slope as steep or out of the specified tolerance. Re-milling a low area will only compound the issue and more than likely extend the limits of the deficient area.

Turtle Southeast, Inc and East Coast Milling Turtle, LLC have reviewed the specifications in section 327 in its entirety and feel that we have some valuable input that could help the Department achieve their Quality Control Goals. We would appreciate the opportunity to

discuss the specifications at your convenience. Please feel free to contact me directly at 727-638-1801 or via Email @ j.danello@turtlese.com to schedule a meeting.

Response:
All comments have already been addressed in 327-3.2:

> 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 an engineering determination indicates that the deficiencies are sufficiently separated so as not to significantly affect the final cross slope or project grade.
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> 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.

No change will be made to the specifications.

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