



## *Florida Department of Transportation*

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### **MEMORANDUM**

**DATE:** June 19, 2015

**TO:** Specification Review Distribution List

**FROM:** Daniel Scheer, P.E., State Specifications Engineer

**SUBJECT:** Proposed Specification: **3270000 Milling of Existing Asphalt Pavement.**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

The changes are proposed by Richard Hewitt of the State Construction Office to improve grammar and readability.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or online at <http://www2.dot.state.fl.us/ProgramManagement/Development/IndustryReview.aspx> . Comments received after **July 17, 2015**, may not be considered. Your input is encouraged.

DS/ot  
Attachment

**MILLING OF EXISTING ASPHALT PAVEMENT.**  
**(REV 5-28-15)**

SECTION 327 is deleted and the following substituted:

**SECTION 327**  
**MILLING OF EXISTING ASPHALT PAVEMENT**

**327-1 Description.**

Remove existing asphalt concrete pavement by milling to improve the rideability and cross-slope of the finished pavement, to lower the finished grade adjacent to existing curb ~~prior to~~ *before* resurfacing, or to completely remove existing pavement.

When milling to improve rideability, the Plans will specify an average depth of cut.  
Take ownership of milled material.

**327-2 Equipment.**

Provide a milling machine capable of maintaining a depth of cut and ~~cross-slope~~ *cross-slope* ~~that will~~ to achieve the results specified in the Contract Documents. Use a machine with a minimum overall length (out-to-out measurement excluding the conveyor) of 18 feet and a minimum cutting width of 6 feet.

Equip the milling machine with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.

To start the project, the Engineer will approve any commercially manufactured milling machine that meets the above requirements. If it becomes evident after starting milling that the milling machine cannot consistently produce the specified results, the Engineer will reject the milling machine for further use.

The Contractor may use a smaller milling machine when milling to lower the grade adjacent to existing curb or other areas where it is impractical to use the above described equipment.

Equip the milling machine with means to effectively limit the amount of dust escaping during the removal operation.

For complete pavement removal, the Engineer may approve the use of alternate removal and crushing equipment ~~instead of~~ the equipment specified above.

**327-3 Construction.**

**327-3.1 General:** Remove the existing raised reflective pavement markers ~~prior to~~ *before* milling. Include the cost of removing existing pavement markers in the price for milling.

When milling to improve rideability or ~~cross-slope~~ *cross-slope*, remove the existing pavement to the average depth specified ~~in~~ the Plans, in a manner that will restore the pavement surface to a uniform cross-section and longitudinal profile. The Engineer may require the use of a stringline to ensure maintaining the proper alignment.

Establish the longitudinal profile of the milled surface in accordance with the milling plans. Ensure ~~that~~ the final ~~cross-slope~~ *cross-slope* of the milled surface parallels the surface ~~cross-slope~~ *cross-slope* shown ~~in~~ the Plans or as directed by the Engineer. Establish the ~~cross-slope~~ *cross-slope* of the milled surface by a second sensing device near the outside edge of the cut or by an automatic ~~cross-slope~~ *cross-slope* control mechanism. The Plans may waive

the requirement of automatic grade or ~~eross-slope~~*cross-slope* controls where the situation warrants such action.

Operate the milling machine to minimize the amount of dust being emitted. The Engineer may require prewetting of the pavement.

Provide positive drainage of the milled surface and the adjacent pavement. Perform this operation on the same day as milling. Repave all milled surfaces no later than the day after the surface was milled.

If traffic is to be maintained on the milled surface ~~prior to~~*before* the placement of the new asphalt concrete, provide suitable transitions between areas of varying thickness to create a smooth longitudinal riding surface. Produce a pattern of striations that will provide an acceptable riding surface. The Engineer will control the traveling speed of the milling machine to produce a texture that will provide an acceptable riding surface.

~~Prior to~~*Before* opening an area which has been milled to traffic, sweep the pavement with a power broom or other approved equipment to remove, to the greatest extent practicable, fine material which will create dust under traffic. Sweep in a manner ~~that will to~~ minimize the potential for creation of a traffic hazard and to minimize air pollution.

Sweep the milled surface with a power broom ~~prior to~~*before* placing asphalt concrete.

In urban and other sensitive areas, use a street sweeper or other equipment capable of removing excess milled materials and controlling dust. Obtain the Engineer's approval of such equipment, contingent upon its demonstrated ability to do the work.

Perform the sweeping operation immediately after the milling operations or as directed by the Engineer.

**327-3.2 Quality Control Requirements:** Furnish a ~~n4-foot~~*long* electronic level ~~with a length of 4 feet and an accurate to ey of plus or minus~~ 0.1 degree, - approved by the Engineer for the control of ~~eross-slope~~*cross-slope*. Make this electronic level available at the jobsite at all times during milling operations. Calibrate and compare electronic levels in accordance with 330-9.3.1 at a minimum frequency of once per day before any milling operation.

Multiple cuts may be made to achieve the required pavement configuration or depth of cut.

**327-3.2.1 Cross-Slope Measurement:** Measure the ~~eross-slope~~*cross-slope* of the milled surface by placing the level at the center ~~location~~*of* ~~athe~~ lane and perpendicular to the roadway centerline. Record all the measurements to the nearest 0.1% on an approved form and submit ~~the data~~ to the Engineer ~~for documentation~~.

**327-3.2.1.1 Cross-Slope Measurement Frequency:**

1. Tangent Sections: Measure the ~~eross-slope~~*cross-slope* ~~per lane~~ at a minimum frequency of one measurement every 100 feet per lane. ~~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 ~~eross-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~~.

2. Superelevated Sections: Measure the ~~eross-slope~~*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 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 section. For ~~the every~~ transition sections, measure the ~~cross-slope~~ cross-slope at control points identified ~~in~~ in the Plans or, if not shown ~~in~~ in the Plans, at a control point at a location of 0.0% ~~cross-slope~~ cross-slope.~~

~~For curves where the length of the fully superelevated section is less than 250 feet, measure the cross-slope at the beginning point, midpoint and ending point of the fully superelevated section, 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.~~

**327-3.2.1.2 Cross-Slope Deviations and Corrections:** Calculate the absolute deviation of each cross-slope measurement and the average of the absolute deviations of ten consecutive cross-slope measurements. ~~(The absolute deviation is the positive value of a deviation).~~ In superelevated sections, when the number of measurements is less than ten, average the absolute deviation of all measurements.

If the average absolute deviation of ~~the any~~ ~~cross-slope~~ cross-slope measurements falls outside the acceptance tolerance shown in Table 327-1, stop the milling operations and make adjustments until the problem is resolved to the satisfaction of the Engineer. If an individual ~~cross-slope~~ 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. For pavement with multiple cuts, the deficient areas not caused by the final cut may be left in place upon approval of the Engineer. All milling corrections shall be completed before placement of the asphalt course unless stated otherwise ~~in~~ on the Plans or as determined by the Engineer.

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

Should the Contractor wish to have any *required* 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~~ cross-slope or project grade.

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

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 ~~section~~ areas.

**327-3.3 Verification:** The Engineer will verify the Contractor's ~~cross-slope~~ *cross-slope* measurements by randomly taking a minimum of ten ~~cross-slope~~ *cross-slope* measurements per lane per mile in tangent sections, *at* control points in transition sections, and a minimum of three ~~cross-slope~~ *cross-slope* measurements ~~in~~ fully superelevated sections. The Engineer will measure the ~~cross-slope~~ *cross-slope* of the milled surface by placing the level at the center ~~location~~ of ~~the~~ lane and perpendicular to the roadway centerline.

**327-3.3.1 Cross-Slope Deviations and Corrections:** If the average absolute deviation or an individual ~~cross-slope~~ *cross-slope* deviation falls outside the acceptance tolerance ~~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 327-3.2, stop the milling operation until the ~~problem~~ *issue* 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~~ *cross-slope* of the milled surface at any time by taking ~~cross-slope~~ *cross-slope* measurements at any location.

#### **327-4 Milled Surface.**

Provide a milled surface with a reasonably uniform texture, within 1/4 inch of a true profile grade, and with no deviation in excess of 1/4 inch from a straightedge applied to the pavement perpendicular to the centerline. Ensure ~~that~~ the variation of the longitudinal joint between multiple cut areas does not exceed 1/4 inch. The Engineer may accept areas varying from a true surface in excess of the above stated tolerance without correction if the Engineer determines ~~that~~ they were caused by a pre-existing condition which could not have reasonably been corrected by the milling operations. Correct any unsuitable texture or profile, as determined by the Engineer, at no ~~additional expense~~ *cost* to the Department.

The Engineer may require remilling of any area where a surface lamination causes a non-uniform texture to occur.

#### **327-5 Method of Measurement.**

The quantity to be paid for will be the plan quantity area, in square yards, over which milling is completed and accepted.

#### **327-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section, including hauling off and stockpiling or otherwise disposing of the milled material.

Payment will be made under:

Item No. 327- 70- Milling Existing Asphalt Pavement - per square yard.