Origination Form

Specifications

Name:	Richard Hewitt	**Specification Number:**	9.4.5, 9.4.6, 9.5
Email:	Richard.Hewitt@dot.state.fl.us	**Associated Specs:**	338 - Table 1
Date:	2024-04-23T12:15:49Z	**Verified:**	VERIFIED

Summary:

Moving International Roughness Index (IRI) based Smoothness Incentive Disincentive Specification language from Special Provision (Limited Access Roads) and Modified Special Provision (Non-Limited Access Roads) into the Standard Specifications. This coincides with removal of the Ride Number system.

Justification:

The IRI Incentive Disincentive SP and MSP have resulted in Smoother Pavements with less straightedge testing, thus increasing safety by reducing the need for workers to straightedge areas that will be tested with the laser profilers. Moving it to from SP and MSP will ensure incorporation of these specs into all future highspeed projects.

Do the changes affect other types of specifications?

Special Provisions

List Specifications Affected:

SP3300802 would be deleted if these changes are made to Standard Specification 330.

Other Affected Documents/Offices	Contacted	Yes/No
Other Standard Plans		No
Florida Design Manual	Rhonda Taylor	Yes
Structures Manual		No
Basis of Estimates Manual		No
Approved Product List		No
Construction Office		No

Maintenance Office		No
Materials Manual		No
Traffic Engineering Manual		No

Are changes in line with promoting and making progress on improving safety, enhancing mobility, inspiring innovation, and fostering talent; explain how?

Improves safety by reducing the amount of time MOT must be set up and amount of time workers must be next to traffic when performing straightedging. Inspires innovation as it uses laser profilers more for project smoothness acceptance and incentivizes contractors to pave smoother (and disincentivizes them from paving rougher). Enhances mobility as less time lanes are closed to perform straightedge testing as laser profilers can obtain smoothness ratings at highway speed and new spec does not require retesting laser-tested areas with a straightedge.

What financial impact does the change have; project costs, pay item structure, or consultant fees?

If pavements statewide are paved smoother than they were when spec was developed then we'd pay a slight incentive to the contractor. However, since smoother roads last longer and reduce wear and tear on vehicles, I believe there is a great return on any small incentives paid.

What impact does the change have on production or construction schedules?

No changes to production schedule, could slightly reduce construction schedule as additional MOT and straightedging areas that were laser-tested (required in current Ride Number spec) is no longer needed with this IRI-based Incentive Disincentive Smoothness spec.

How does this change improve efficiency or quality?

Improves efficiency as additional MOT and straightedging areas that were laser-tested (required in current Ride Number spec) is no longer needed with this IRI-based Incentive Disincentive Smoothness spec. Improves quality as smoothness quality is incentivized and roughness is disincentivized and as we've implemented this on projects we've seen smoothness quality improve. In fact, smoothness project in Flroida was paved under this spec on I-75.

Which FDOT offices does the change impact?

Primarily Construction and Design

What is the impact to districts with this change?

Projects would pay a slight incentive is smooth pavement is achieved, would obtain disincentive money from contractor if pavement is rough.

Does the change shift risk and to who?

Change puts onus of obtaining smoothness on the contractor and requires less oversight by CEI/FDOT regarding

the structural course asphalt. Past project use shows contractors can make wise decisions regarding previous pavement lifts to ultimately achieve very smooth pavements and obtain an incentive.

Provide summary and resolution of any outstanding comments from the districts or industry.

Comments and Responses are available on the Track the Status of Revisions hyperlink located on the Specifications landing page: https://www.fdot.gov/programmanagement/Specs.shtm

What is the communication plan?

Through the established specification revision process (e.g., Internal and Industry Review)

What is the schedule for implementation?

The Standard Specifications eBook and Workbook are effective July 1st every year.

HOT MIX ASPHALT - GENERAL CONSTRUCTION REQUIREMENTS.
(REV 4-23-24)

SUBARTICLE 330-9.4.5.1 is deleted and the following substituted:

330-9.4.5 QC Testing:

330-9.4.5.1 General: Straightedge the final Type SP structural layer and friction course layer in accordance with 330-9.4.2, with the exception that if the method of acceptance is by laser profiler, then straightedging of the final structural course and the friction course layer is not required unless otherwise stated in the Specifications. If the project's method of acceptance is by laser profiler, transverse joints at the beginning and end of the project, at beginning and end of bridge structures, ramps, acceleration/deceleration lanes and other areas not suitable for testing with the laser profiler, will be tested and accepted by straightedging. Test all pavement lanes and ramps where the width is constant and document all deficiencies in excess of 3/16 inch on a form approved by the Engineer.

SUBARTICLE 330-9.4.5.4 is deleted and the following substituted:

330-9.4.5.4 Final Type SP Structural Layer: If method of acceptance for any portion of the pavement, is by straightedge testing, ~~S~~straightedge these areas on the final Type SP structural layer in accordance with 330-9.4.2, either behind the final roller of the paving train or as a separate operation. Notify the Engineer of the location and time of straightedge testing a minimum of 48 hours before beginning testing. The Engineer will verify the straightedge testing by observing the QC straight edging operations. Address all deficiencies in excess of 3/16 inch in accordance with 330-9.5.

SUBARTICLE 330-9.4.6.2 is deleted and the following substituted:

330-9.4.6.2 Laser Acceptance: For areas of high speed roadways where the design speed is equal to or greater than 55 miles per hour, acceptance testing for pavement smoothness of the friction course (for mainline traffic lanes only) will be based on the Laser Profiler using the International Roughness Index (IRI) as defined in ASTM E1926. Ramps, acceleration and deceleration lanes, and other areas not suitable for testing with the Laser Profiler will be tested and accepted with the straightedge in accordance with 330-9.4.5.5 and 330-9.4.6.1.

The pavement smoothness of each lane will be determined by a Laser Profiler furnished and operated by the Department in accordance with FM 5-549 and a report issued with the ~~Ride Number (RN)~~ International Roughness Index (IRI) reported to ~~one decimal place~~whole numbers. If corrections are made, as required following Laser Acceptance, the pavement will ~~not~~ be retested for smoothness using the Laser Profiler.

For this testing, the pavement will be divided into 0.1 mile ~~segments~~LOTs. Partial ~~segments~~LOTs equal to or greater than 0.01 mile will be considered as a 0.1 mile ~~segment~~LOT. ~~The pavement will be accepted as follows:~~

~~1. For segments with a RN greater than or equal to 4.0, the pavement will be accepted at full pay.~~

~~2. For segments with a RN less than 4.0, the Engineer will further evaluate the data in 0.01 mile intervals for both wheel paths.~~

~~If the RN is 3.5 or above for all 0.01 mile intervals in both wheel paths, the segment will be accepted at full payment.~~

~~If the RN is less than 3.5 for one or more 0.01 mile intervals, the segment will be tested with the rolling straightedge in both wheel paths in accordance with FM 5-509. If approved by the Engineer, this straightedging may be completed (in both wheel paths) as part of the QC straightedging operations described in 330-9.4.5.5, before testing with the laser profiler. Notify the Engineer of the location and time of straightedge testing a minimum of 48 hours before beginning testing. The Engineer will verify the straightedge testing by observing the QC straightedging operations. Address all deficiencies in excess of 3/16 inch in accordance with 330-9.5.~~

~~Test and accept areas at the beginning and ending of the project, bridge approaches and departures, and areas where the segment is less than 0.01 mile, with the straightedge in accordance with 330-9.4.5.5 and 330-9.4.6.1.~~

330-9.4.6.2.1 Evaluation Process: As soon as the friction course to be placed is scheduled, notify the Engineer. A minimum of 14 calendar days from notification is needed for the Department to schedule the equipment. Prior to testing and for the full project limits, ensure all lanes are open, free from obstructions, and all debris is removed from roadway.

330-9.4.6.2.2 Acceptable Pavement: If the initial ride acceptance test shows all project LOTs to be less than or equal to the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4, LOT incentive/disincentive pay will be calculated as described in 330-9.4.6.2.4.

330-9.4.6.2.3 Unacceptable Pavement: If any LOT in the project has an IRI greater than the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4, the project data will be reprocessed using continuous analysis to define the limits of the unacceptable pavement.

For unacceptable LOTs, the limits of unacceptable pavement are defined as those areas of pavement 50 feet either side of where the continuous plot line exceeds the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4. The limits of unacceptable pavement may extend into neighboring LOTs.

For unacceptable LOTs at either end of the project:

1. If the continuous analysis ends above the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4, 0.05 mile from the end of the project, then the corrective action limits will extend to the end of the project.

2. If the continuous analysis ends at or below the IRI Upper Disincentive Limit 0.05 mile from the end of the project, then the corrective action limits are defined above.

For unacceptable LOTs at breaks in paving such as bridges:

1. If the continuous analysis ends above the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 0.05 mile from the break in paving, then the corrective action limits will extend from the break in paving to a point as defined above.

2. If the continuous analysis ends at or below the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 0.05 mile from the break in paving then the pavement will be left in place with the appropriate disincentive applied.

3. If any LOTS with an IRI greater than the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 are left in place, they will be paid at maximum disincentive

Address all areas of unacceptable pavement in accordance with 330-9.5.

As soon as all corrections are scheduled, notify the Engineer. A minimum of 14 calendar days from notification is needed for the Department to schedule the equipment. Prior to testing and for the full project limits, ensure all lanes are open, free from obstructions, and all debris is removed from roadway.

Repeat this process as necessary until all LOTs have an IRI less than or equal to the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 at which time, incentive/disincentive will be calculated for the project as described in 330-9.4.6.2.4.

Table 330-4
Smoothness Class IRI Pay Adjustment Limits

Smoothness Class	Incentive	Full Pay	Disincentive	Corrective Action / Remove & Replace
1	≤35	36 – 42	43 – 95	>95
2	≤42	43 – 55	56 – 95	>95
3	≤51	52 – 62	63 – 110	>110
4	≤61	62 – 85	86 – 125	>125
5	≤84	85 – 105	106 – 125	>125
Limited Access	≤42	43 – 55	56 – 95	>95

330-9.4.6.2.4 Calculating Incentive/Disincentive: For all LOTs, pay adjustment incentive/disincentive will be based on the dollar value corresponding to each LOT's IRI per the project's Smoothness Class as shown in Tables 330-5 through 330-10.

The project's Smoothness Class will be set by the Department in accordance with FM 5-623. Based on the Smoothness Class, the IRI Limits for that Smoothness Class will be used to determine the Incentives and Disincentives for all LOTs, as well as LOT's that meet the remove and replace criteria. The project's Smoothness Class will be designated in the Plans. If the project's Smoothness Class is not designated in the Plans, for Non-Limited Access roadways, the project's Smoothness Class will be Class 2, for Limited-access roadways, the project's Smoothness Class will be Limited Access.

Incentive/disincentive will be determined from the initial test for all LOTs less than or equal to the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 and that were not affected by remove and replace corrections.

Incentive/disincentive for any LOTs affected by remove and replace corrections will be determined from the final acceptance run (once at or below the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4).

LOT incentive / disincentive for a project will be calculated once all project LOTs are less than or equal to the IRI Upper Disincentive Limit for the project's Smoothness Class as shown in Table 330-4 as follows:

$$\text{LOT incentive/disincentive} = \frac{\text{LOT Pay Adjustment} * \text{LOT length (miles)}}{0.1}$$

Project incentive/disincentive is the sum of the incentives / disincentives of all LOTs in the project.

Total project incentive shall not exceed 5% of the friction course price.

Total project disincentive shall not result in payment less than 80% of the friction course price.

The friction course price is the sum of each friction course pay item's bid unit price times each pay item's pay quantity (as determined in accordance with 337-11). For lump sum projects, the friction course price is the sum of each friction course type's unit price (as determined in accordance with 9-2) times each friction course type's pay quantity.

330-9.4.6.2.5 Project Level Consistency Incentive: If all project LOTs are less than or equal the IRI Upper Full Pay Limit for the project's Smoothness Class as shown in Table 330-4, the project will earn an additional 3% incentive based on the friction course price. The friction course price is described in 330-9.4.6.2.4. The project level consistency incentive is in addition to the project incentive outlined in 330-9.4.6.2.4.

Table 330-5 – Smoothness Class 1
Laser Acceptance Tolerance

LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤28	$160	51	-$180	68	-$520
29	$140	52	-$200	69	-$540
30	$120	53	-$220	70	-$560
31	$100	54	-$240	71	-$580
32	$80	55	-$260	72	-$600
33	$60	56	-$280	73	-$620
34	$40	57	-$300	74	-$640
35	$20	58	-$320	75	-$660
36 - 42	Full Pay	59	-$340	76	-$680
43	-$20	60	-$360	77	-$700
44	-$40	61	-$380	78	-$720
45	-$60	62	-$400	79	-$740
46	-$80	63	-$420	80	-$760

Table 330-5 – Smoothness Class 1 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
47	-$100	64	-$440	81	-$780
48	-$120	65	-$460	≥82	-$800
49	-$140	66	-$480		
50	-$160	67	-$500		
*LOTs > 95 IRI left in place receive -$800 LOT pay adjustment.					

Table 330-6 – Smoothness Class 2 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤35	$160	64	-$180	81	-$520
36	$140	65	-$200	82	-$540
37	$120	66	-$220	83	-$560
38	$100	67	-$240	84	-$580
39	$80	68	-$260	85	-$600
40	$60	69	-$280	86	-$620
41	$40	70	-$300	87	-$640
42	$20	71	-$320	88	-$660
43 - 55	Full Pay	72	-$340	89	-$680
56	-$20	73	-$360	90	-$700
57	-$40	74	-$380	91	-$720
58	-$60	75	-$400	92	-$740
59	-$80	76	-$420	93	-$760
60	-$100	77	-$440	94	-$780
61	-$120	78	-$460	≥95	-$800
62	-$140	79	-$480		
63	-$160	80	-$500		
*LOTs > 95 IRI left in place receive -$800 LOT pay adjustment.					

Table 330-7 – Smoothness Class 3 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤41	$220	69	-$140	87	-$500
42	$200	70	-$160	88	-$520
43	$180	71	-$180	89	-$540
44	$160	72	-$200	90	-$560
45	$140	73	-$220	91	-$580
46	$120	74	-$240	92	-$600
47	$100	75	-$260	93	-$620
48	$80	76	-$280	94	-$640
49	$60	77	-$300	95	-$660
50	$40	78	-$320	96	-$680
51	$20	79	-$340	97	-$700
52 - 62	Full Pay	80	-$360	98	-$720
63	-$20	81	-$380	99	-$740
64	-$40	82	-$400	100	-$760
65	-$60	83	-$420	101	-$780
66	-$80	84	-$440	≥102	-$800
67	-$100	85	-$460		
68	-$120	86	-$480		
*LOTs > 110 IRI left in place receive -$800 LOT pay adjustment.					

Table 330-8 – Smoothness Class 4 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤52	$200	92	-$140	109	-$480
53	$180	93	-$160	110	-$500
54	$160	94	-$180	111	-$520
55	$140	95	-$200	112	-$540
56	$120	96	-$220	113	-$560
57	$100	97	-$240	114	-$580
58	$80	98	-$260	115	-$600

Table 330-8 – Smoothness Class 4 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
59	$60	99	-$280	116	-$620
60	$40	100	-$300	117	-$640
61	$20	101	-$320	118	-$660
62 - 85	Full Pay	102	-$340	119	-$680
86	-$20	103	-$360	120	-$700
87	-$40	104	-$380	121	-$720
88	-$60	105	-$400	122	-$740
89	-$80	106	-$420	123	-$760
90	-$100	107	-$440	124	-$780
91	-$120	108	-$460	≥125	-$800
*LOTs > 125 IRI left in place receive -$800 LOT pay adjustment.					

Table 330-9 – Smoothness Class 5 Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤72	$260	84	$20	116	-$220
73	$240	85 - 105	Full Pay	117	-$240
74	$220	106	-$20	118	-$260
75	$200	107	-$40	119	-$280
76	$180	108	-$60	120	-$300
77	$160	109	-$80	121	-$320
78	$140	110	-$100	122	-$340
79	$120	111	-$120	123	-$360
80	$100	112	-$140	124	-$380
81	$80	113	-$160	≥125	-$400
82	$60	114	-$180		
83	$40	115	-$200		
*LOTs > 125 IRI left in place receive -$400 LOT pay adjustment.					

Table 330-10 – Smoothness Class Limited Access Laser Acceptance Tolerance					
LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment	LOT IRI	LOT Pay Adjustment
≤30	$260	60	-$100	78	-$460
31	$240	61	-$120	79	-$480
32	$220	62	-$140	80	-$500
33	$200	63	-$160	81	-$520
34	$180	64	-$180	82	-$540
35	$160	65	-$200	83	-$560
36	$140	66	-$220	84	-$580
37	$120	67	-$240	85	-$600
38	$100	68	-$260	86	-$620
39	$80	69	-$280	87	-$640
40	$60	70	-$300	88	-$660
41	$40	71	-$320	89	-$680
42	$20	72	-$340	90	-$700
43 - 55	Full Pay	73	-$360	91	-$720
56	-$20	74	-$380	92	-$740
57	-$40	75	-$400	93	-$760
58	-$60	76	-$420	94	-$760
59	-$80	77	-$440	≥95	-$800
*LOTs > 95 IRI left in place receive -$800 LOT pay adjustment.					

SUBARTICLE 330-9.5.1 is deleted and the following substituted:

330-9.5 Unacceptable Pavement:

330-9.5.1 Corrections: ~~Address~~Correct all areas of unacceptable pavement at no cost to the Department. For areas accepted by straight edge testing, ~~R~~retest all corrected areas and assure the requirements of these Specifications are met. For areas accepted by laser profiler, the Department will retest all corrected areas to ensure the requirements of these Specifications are met.

Correct all areas of unacceptable pavement, as well as straightedge deficiencies in the friction course or final surface layer by removing and replacing the full depth of the layer of the defective or unacceptable area for the full width of the paving lane. As an exception, the Engineer may allow the Contractor to leave these areas in place if it is determined by the Engineer that the deficiency or unacceptable area is not a significant detriment to the pavement quality. For straightedge deficiencies, a reduction to the pay item quantity will be made in accordance with 330-9.5.2. For unacceptable IRI areas, a pay reduction will be made

using the formula in 330-9.4.6.2.4 where LOT length will be calculated as the sum of the lengths of all LOTs with an IRI greater than Upper Disincentive Limit and LOT pay adjustment will be the maximum disincentive shown in the appropriate Smoothness Class Table.

330-9.5.1.1 Structural Layers: Correct all straightedge deficiencies, as defined in the Specifications, in the Type SP structural layers by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane.

The following options only apply if the structural layer is not the final surface layer:

1. As an option for high and low straightedge deficiencies 5/16 of an inch or less, pave over with friction course to correct the deficiency.

2. As an option for high straightedge deficiencies, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency.

3. As an option for low straightedge deficiencies 8/16 of an inch or less, mill the pavement surface the full lane width to a depth and length adequate to remove the deficiency.

330-9.5.1.2 Friction Course: Correct straightedge deficiencies in the friction course or final surface layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane. As an exception, the Engineer may allow the Contractor to leave these areas in place if it is determined by the Engineer that the deficiency is not a significant detriment to the pavement quality. A reduction to the pay item quantity will be made in accordance with 330-9.5.2.