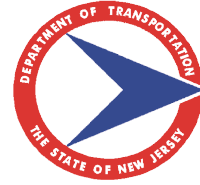


New Jersey Department of Transportation
1035 Parkway Avenue, PO Box 600, Trenton, New Jersey 08625-0600



Baseline Document Change Announcement

Ride Quality

BDC12S-03

May 02, 2012

SUBJECT: Revision to subpart 401.03.03 and Test Method R-1 of the 2007 Standard Specifications for Road and Bridge Construction.

Subpart 401.03.03 and the NJ Test Method R-1 of the 2007 *Standard Specifications* have been revised to provide a new method of developing Pay Equations and to include provisions for excluding all potential impediments in achieving a smooth ride quality of the final riding surface.

The following revisions have been incorporated in Standard Input, SI2007 as of May 02, 2012.

401.03.03 HMA Courses

J. Ride Quality Requirements.

THIS ENTIRE SUBPART IS CHANGED TO:

When the Project exceeds one mile in continuous length, the Department will evaluate the final riding surface using the International Roughness Index (IRI) according to ASTM E 1926. The final riding surface is defined as the last lift of the pavement structure where traffic will be allowed. The Department will use the measured IRI to compute the appropriate pay adjustment (PA). The PA will be positive for superior quality work or negative for inferior quality work.

The Department will calculate the PA as specified in Table 401.03.03-7 and will base PA on lots of 0.01 mile length for each lane, ramp, and shoulder and 0.005 mile for each overlaid bridge structure.

- 1 **Smoothness Measurement.** The Department will test the longitudinal profile of the final riding surface for ride quality with a Class 1 Inertial Profiling System according to AASHTO M 328 and NJDOT R-1. If project conditions preclude the use of the Class 1 Inertial Profiling System, the Department will use a Class 1 walking profiler or lightweight profiler.

The IRI value reported for each lot is the average of 3 runs of each wheel path, unless otherwise directed by the Department.

2. **Quality Control Testing.** Perform control testing during lift placement to ensure compliance with the ride quality requirements specified in Table 401.03.03-7
3. **Preparation for IRI Testing.** Provide traffic control when the Department performs IRI testing. Perform mechanical sweeping of the surface before IRI testing. To facilitate auto triggering on laser profilers, place a single line of preformed traffic marking tape perpendicular to the roadway baseline 300 feet before the

beginning and after the end of each lane, shoulder, and ramp to be tested or at the direction of the Department. Submit the actual stationing for each traffic marking tape location to the RE.

4. **Quality Acceptance.** The Department will determine acceptance and provide PA based on the following:
- a. **Pay Adjustment.** The pay equations in Table 401.03.03-7 express the PA in dollars per lot of 0.01 mile or 0.005 mile as shown in the table. The number of lots for final pay adjustment will be reduced by the number of lots excluded for each segment shown in Table 401.03.03-7. Lots excluded from final PA will be those with the highest recorded IRI numbers for respective roadway and bridge deck segments. IRI numbers are in inches per mile.

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 USE RIDE QUALITY REQUIREMENT (RQR) SOFTWARE TO DEVELOP PAY EQUATIONS
 OF TABLE 401.03.03-7 FOR THIS PROJECT.

DOWNLOAD LATEST VERSION OF SOFTWARE FROM -
[HTTP://WWW.STATE.NJ.US/TRANSPORTATION/ENG/PAVEMENT/RIDEQUALITY.SHTM](http://www.state.nj.us/transportation/eng/pavement/ridequality.shtm)

SME CONTACT – SEND EMAIL TO RQSPECSUPPORT@DOT.STATE.NJ.US

IMPEDIMENTS INCLUDE THE FOLLOWING:

- (I). METAL IMPEDIMENTS, SUCH AS UTILITY COVERS, MANHOLES, CATCH BASINS AND INLETS, LOCATED IN THE LANE AND IN SHOULDERS WITHIN THE DISTANCE SPECIFIED IN RQR. THE EXCLUSION LENGTH FOR METAL IMPEDIMENTS IS SPECIFIED IN THE RQR.
- (II). TRANSVERSE JOINTS THAT SEPARATE THE NEW PAVEMENT FROM AN EXISTING PAVEMENT, INTERSECTIONS, RAILROAD CROSSINGS, AND OTHER FEATURES IN THE PAVEMENT DEEMED BY THE DESIGNER TO BE A POTENTIAL IMPEDIMENT TO ACHIEVING A SMOOTH RIDE QUALITY. THE EXCLUSION LENGTH IS THE LENGTH OF THE FEATURE PLUS LENGTH AS SPECIFIED IN RQR BEFORE AND AFTER EACH FEATURE

(SAMPLE ONLY)

TABLE 401.03.03-7 PAY EQUATIONS FOR RIDE QUALITY				
	EXCLUDED LOTS	PAY EQUATION(S)		
ROUTE 00 FROM MP 6.3 TO MP 7.9	LANE 1 - 2	PA ON LOTS OF 0.01 MILE LENGTH		
		IRI < 28	PA = \$50	
	LANE 2 - 10	28 ≤ IRI < 48	PA = \$120 – (\$2.50 × IRI)	
		48 ≤ IRI ≤ 58	PA = \$0	
		58 < IRI ≤ 128	PA = (IRI – 58) × (-\$7.1429)	
		IRI > 128	REMOVE & REPLACE	

ROUTE 00 RAMPS AND SHOULDERS	NONE	PA ON LOTS OF 0.01 MILE LENGTH	
		IRI ≤ 120	PA = \$0
		120 < IRI ≤ 170	PA = (IRI-120) × (-\$10.00)
		IRI > 170	REMOVE & REPLACE
OVERLAID BRIDGE DECKS ON ROUTE 00 BETWEEN MP 7.9 AND MP 8.1	NONE	PA ON LOTS OF 0.005 MILE LENGTH	
		IRI ≤ 120	PA = \$0
		120 < IRI ≤ 170	PA = (IRI - 120) × (-\$5.00)
		IRI > 170	REMOVE & REPLACE

(III)ADD MORE ROWS IN TABLE 401.03.03-7 FOR MULTIPLE SECTIONS AS REQUIRED. INCLUDE EXCLUSIONS FOR EACH LANE TO BE TESTED WITHIN THE PROJECT LIMITS. INCLUDE ATLEAST ONE EXCLUSION FOR EACH LANE, IF THERE IS NO IMPEDIMENT. THE LANE DESIGNATION SHALL BE MADE BY INCREASING NUMBERS FROM LEFT TO RIGHT IN THE DIRECTION OF TRAFFIC.WITH LEFT LANE BEING LANE 1.

(IV) IF THE EXISTING IRI IS ALREADY IN BONUS RANGE OF PAY EQUATIONS, THEN THE SPECIFIED TARGET IRI RANGE I.E. RANGE WITH ZERO PAY ADJUSTMENT SHALL BE ADJUSTED SUCH THAT THE PROJECT'S IRI TARGET RANGE LOWER LIMITS STARTS AT THE EXISTING IRI VALUE.

EXAMPLE:
EXISTING IRI = 100 INCH/MILE
PROPOSED TARGET IRI RANGE
110 ≤ IRI ≤ 120 PA=0

USE:-
100 ≤ IRI ≤ 120 PA=0

MODIFY PAY EQUATIONS ACCORDINGLY.

Table 401.03.03-7 Pay Equations for Ride Quality		
	Excluded Lots	Pay Equation(s)
Route __ from MP __. to MP __.	Lane 1 - __	PA on lots of 0.01 mile length
		IRI < __ PA = \$50
	Lane 2 - __	__ ≤ IRI < __ PA = \$ __. __ - (\$2.50 × IRI)
		__ ≤ IRI ≤ __ PA = \$0
		__ < IRI ≤ __ PA = (IRI - __) × (-\$7.1429)
		IRI > __ Remove & Replace
Route __ Ramps and Shoulders	None	PA on lots of 0.01 mile length
		IRI ≤ 120 PA = \$0

		120 < IRI ≤ 170	PA = (IRI-120) x (-\$10.00)
		IRI > 170	Remove & Replace
Overlaid Bridge Decks on Route __ Between MP __. and MP __.	None	PA on lots of 0.005 mile length	
		IRI ≤ 120	PA = \$0
		120 < IRI ≤ 170	PA = (IRI - 120) x (-\$5.00)
		IRI > 170	Remove & Replace

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b. Removal and Replacement. If the final IRI is greater than the Remove and Replace Value (RRV), remove and replace the lot. Replacement work is subject to the same requirements as the initial work.

If less than 8 percent of paving lots exceeds the RRV, submit a plan for corrective action. If the corrective action plan is not approved by the RE, remove and replace the designated lots. If the corrective action plan is approved and the lots are reworked, the lots are subject to the requirements of subpart 401.03.03.J Ride Quality Requirements except that the lots are not eligible for positive PA. The RE may allow the lots to remain in place and apply the pay adjustment as computed in Table 401.03.03-7.

NJDOT R-1 – OPERATING INERTIAL PROFILER SYSTEMS FOR EVALUATING PAVEMENT PROFILES

THIS ENTIRE TEST METHOD IS CHANGED TO:

- A. Scope.** This test method describes the procedure for operating, verifying the calibration of an ASTM E 950 Class 1 Inertial Profiler System (IPS) and testing riding surface for pavement profiles evaluation.
- B. Apparatus.** Use an IPS that meets the requirements of AASHTO M 328 and ASTM E 950, Class 1 and the following:
 - 1. Certify the IPS according to AASHTO R 56 at least every 2 years. If a system component is replaced, re-certify the system. Perform the certification at a site approved by the Department.
 - 2. The data system provides the raw profile data in an ASCII format acceptable to the Department.
 - 3. The computer program uses a high-pass filter set at 300 feet and reads an ASCII or text file for computing the International Roughness Index (IRI) in inches per mile.
 - 4. The current version of *ROADRUF*, *ProVal*, or other Department approved pavement profile analysis software is used to compute the IRI.
- C. Procedure.** Perform the following steps:
 - 1. Operate the IPS according to AASHTO R 57 and ASTM E 950.
 - 2. On a daily basis before data collection, check the equipment and operating system for operational stability and calibration. Perform necessary calibration procedures according to equipment manufacturer’s procedures and applicable standards. Operators shall maintain a log documenting the calibration history.
 - 3. Ensure that the operators of the IPS have completed a profile training course, such as NHI Course 131100, have been trained specifically on the IPS they will be operating, and are proficient in the operation of the IPS.
 - 4. Make provisions to automatically start and stop the IPS recording at the beginning and end of testing.
 - 5. Ensure retroreflective traffic striping tape or other approved mechanism is placed at the beginning and end of each direction of travel for automatically triggering the start and stop of profile measurements.

6. Collect at least 0.05-mile of data before the area to be tested to allow the system to stabilize before profile measurements are obtained. Collect data in a continuous run through the length to be tested. If the run is interrupted, discard the results and re-run the length.
7. Test the full extent of each wheel path of each lane in the longitudinal direction of travel. The wheel path is defined as being located approximately 3 feet on each side of the centerline of the lane and extending for the full length of the lane. Lanes are defined by striping.
8. Run three tests each wheel path and report average of three runs each wheel path.
9. Exclude locations where the traffic striping includes turn lanes that cause the through traffic lane to cross over a longitudinally paved joint, ramps, and lanes such as acceleration and deceleration lanes of less than 1,000 feet of continuous through treatment.
10. Report single IRI value average of 3 runs unless otherwise directed. The single IRI value shall be each 0.01 mile length for each lane, ramp, and shoulder and 0.005 mile for each overlaid bridge structure.

Implementation Code R (ROUTINE)

Changes must be implemented in all applicable Department projects scheduled for Final Design Submission at least one month after the date of the BDC announcement. This will allow designers to make necessary plan, specifications, and estimate/proposal changes without requiring the need for an addenda or postponement of advertisement or receipt of bids.

Recommended By:

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Walter McGrosky
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Approved By:

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Richard T. Hammer
Assistant Commissioner,
Capital Program Management