



We Are Finally in the 21st Century

Nevada Department of Transportation's Switch from PRI
(Profile Index) to IRI (International Roughness Index)

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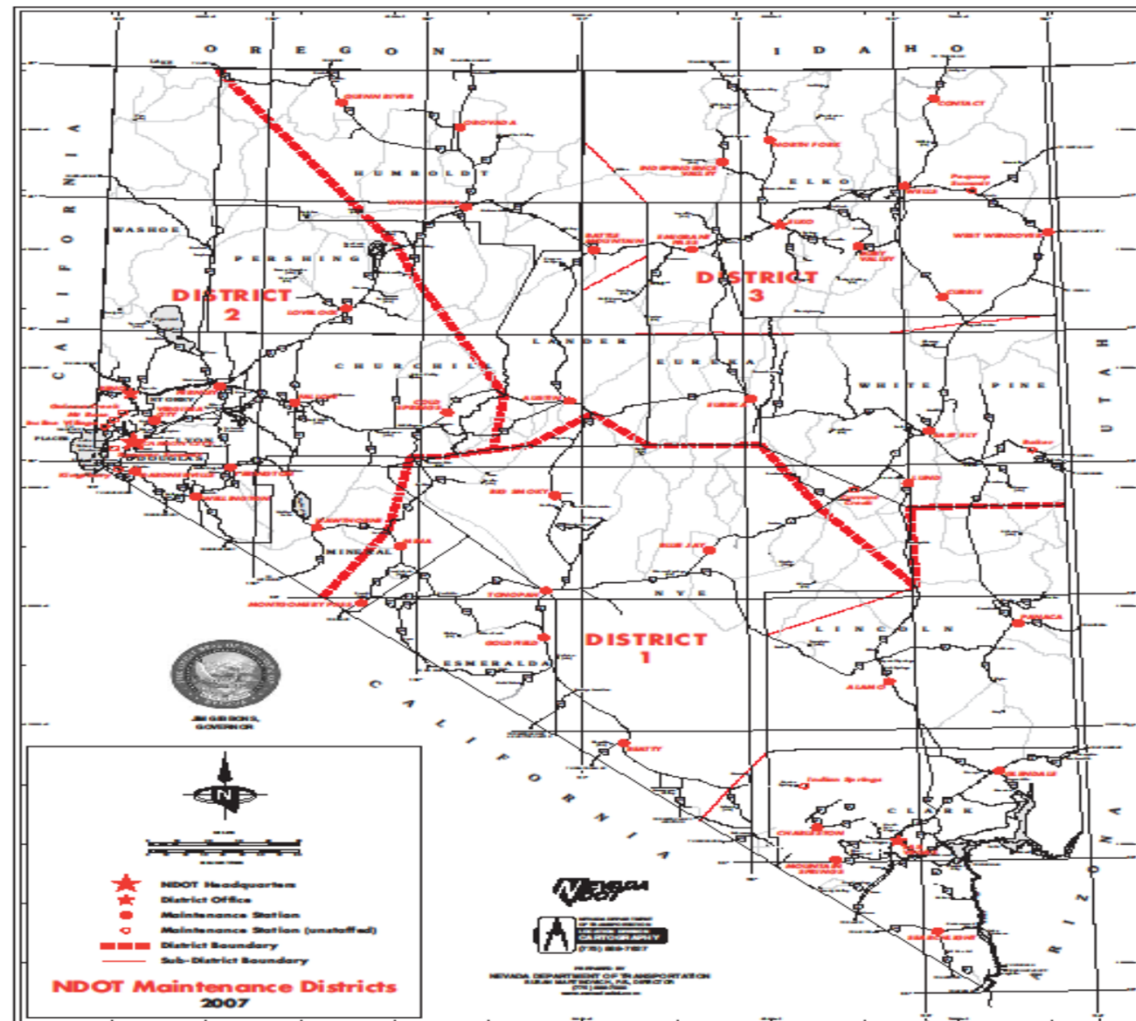
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RPUG 2016 Annual Meeting

Outline

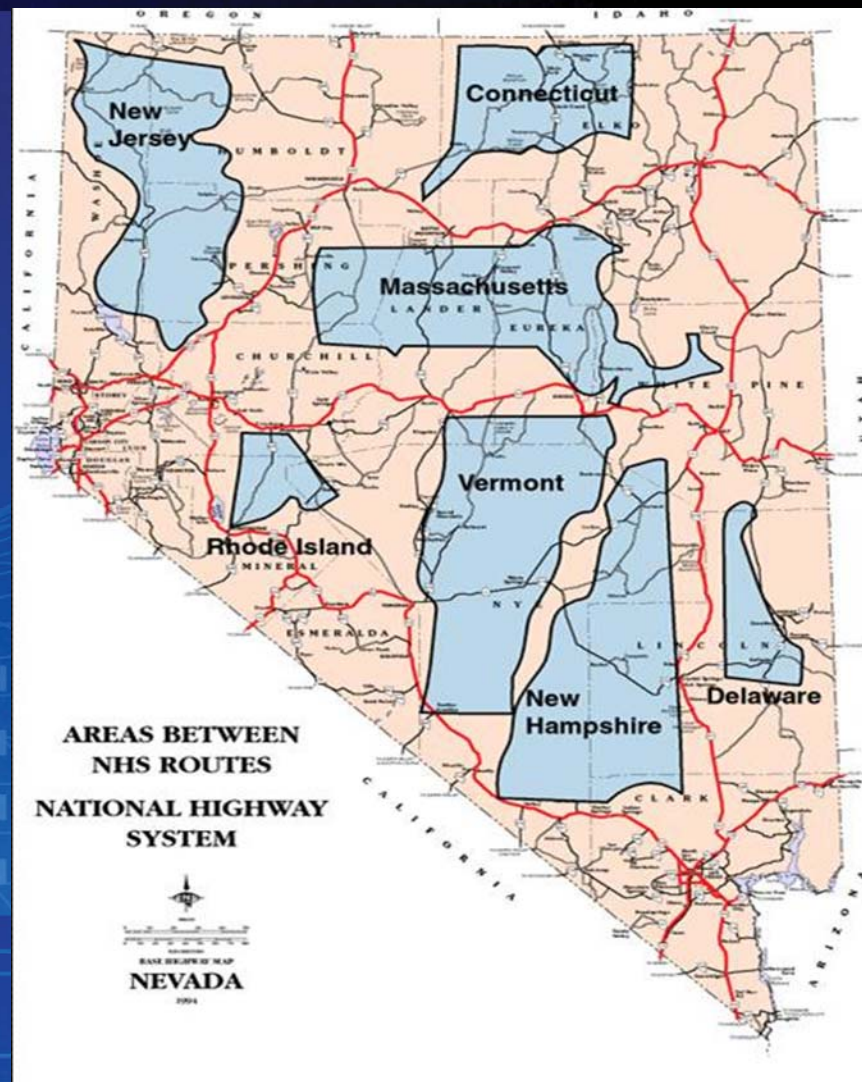
- Roadways Maintained by NDOT
- Past Smoothness Specifications for Project Acceptance (PRI)
- Current Smoothness Specifications for Project Acceptance (IRI)
- Inertial Profiling Equipment Utilized by NDOT
- NDOT Certification Program
- What the Future Holds

Roadways Maintained by NDOT



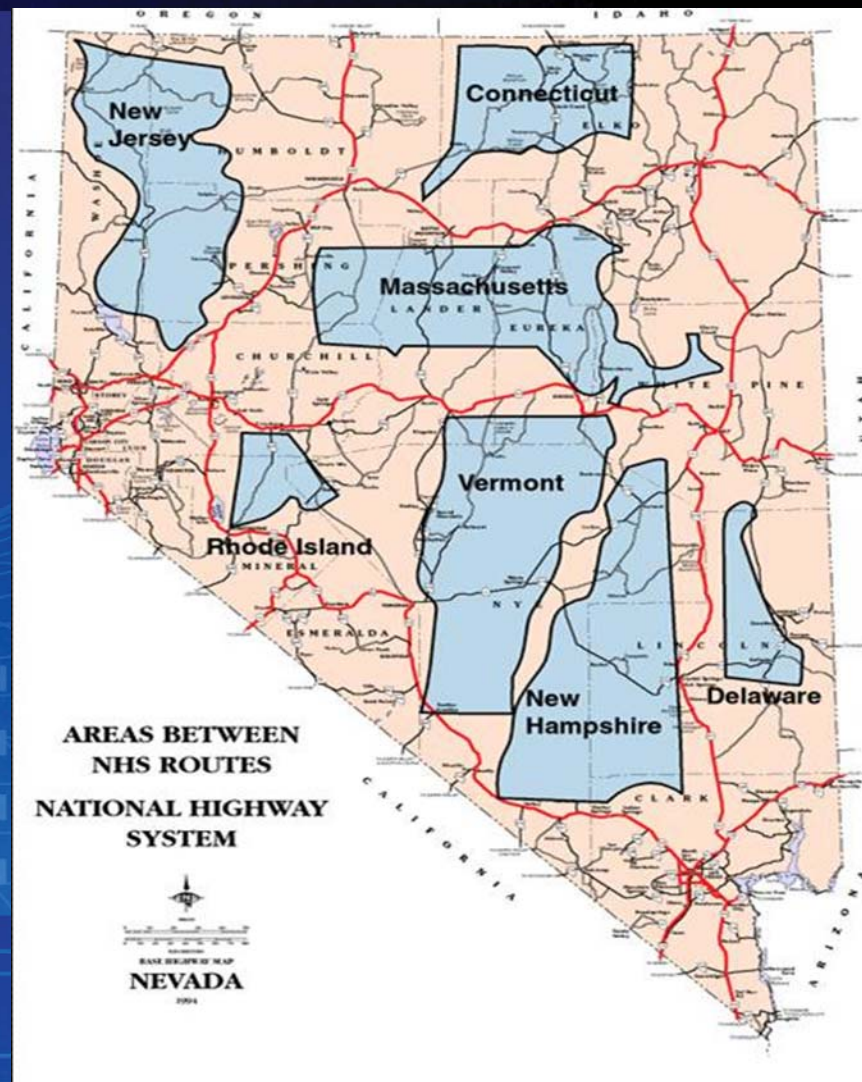
Roadways Maintained by NDOT

- Interstate (NHS)
 - 589 Centerline Miles
- NHS Routes (Non-Interstate)
 - 1,805 Centerline Miles
- US Routes (Non-NHS)
 - 455 Centerline Miles
- State Routes (Non-NHS)
 - 2,188 Centerline Miles



Roadways Maintained by NDOT

- Frontage Roads
 - 272 Centerline Miles
- Collectors/Distributors
 - 32 Centerline Miles
- State Park Roads
 - 55 Centerline Miles





Roadways Maintained by NDOT

Grand Total

Of

5,396 Centerline Miles

Past Smoothness Specifications for Project Acceptance (PRI)



Past Smoothness Specifications for Project Acceptance (PRI)





Past Smoothness Specifications for Project Acceptance (PRI)

- PRI specifications enforced prior to January of 2016
- Utilized two tenths blanking band
- Testing performed in the right wheel path (Both wheel paths for PCCP)
- Contractor's results used in the project acceptance process
- NDOT verified contractor's project acceptance testing
 - Checking parameter settings
 - Spot checks on profile traces using blanking band and bump templates

Past Smoothness Specifications for Project Acceptance (PRI)



- NDOT specified three different smoothness types for HMA
 - Type A (5 in./mi & 0.5 in./0.1 mi)
 - Type B (7 in./mi & 0.7 in./0.1 mi)
 - Type C (10 in./mi & 0.10 in./0.1 mi)
 - NDOT specified a ride incentive/disincentive on final riding surface for Interstate routes.
- NDOT only specified Type A smoothness for PCCP
 - No ride incentive/disincentive

Past/Current Straightedge Specifications for Project Acceptance



Past Straightedge Specifications for Project Acceptance



- Straightedge measurement
 - NDOT personnel perform measurement
 - Twelve foot straightedge is used
 - Measurements taken both parallel and perpendicular to centerline
 - Roadway surface shall not vary by more than 1/4 in. (1/8 in. for PCCP)

ROAD PROFILER USERS' GROUP

2009 Annual Meeting

December 9 - 11, 2009

Atlanta, Georgia

**Sheraton Gateway
Atlanta Airport Hotel**
1900 BULLFINCH ROAD
ATLANTA, GA 30337
770-314-2513

• **Construction Engineers**

• Design Engineers

• **Researchers in Road Practice**

• Researchers in
Pavement Laboratories

• End Users

• Data Collectors

• **Vendors**

• **Federal, State and Local
Government Agencies**

• Contractors

• Consultants

• Universities

• **Equipment Manufacturers**



The 21st Annual Road Profiler Users' Group Meeting will be held at the Sheraton Gateway Airport Hotel in Atlanta, Georgia on December 9 - 11, 2009, the purpose of which is to serve as a forum for the exchange of information between all levels of government, contractors, consultants, universities, equipment manufacturers, vendors, engineers and researchers in pavement and related fields, all of whom with an interest in road profiles, pavement smoothness, and tire pavement function/interaction. A registration fee of \$220 is required, and registration after November 25, 2009 will be subject to the late registration fee of \$250.

Equipment vendors are invited to attend the meeting to exhibit their products. Exhibitor Registration of \$1,100 includes two participants. More exhibitor and sponsorship information can be found on the RPUG website at www.rpug.org.

Please complete the attached registration form or register online at www.pavementpreservation.org/rpug/ For registration questions, contact the National Center for Pavement Preparation at 517-432-8220.

RPUG



More information is available at:
www.RPUG.org



21st Annual Road Profiler Users' Group Meeting Dec. 9 to Dec. 11, 2009, Atlanta, GA

Day 3 - Friday, December 11, 2009

7:00 - 8:00 AM Breakfast

Session VIII	
Profiler Certification and Construction QA/QC (1 of 2) Moderator: Magdy Mikhail, TXDOT	
8:00 - 8:30 AM	"Smooth Ride?" Contractor Performed Tests in the Quality-Assurance Process: The Nevada Experience (Steve Hahn, NVDOT)
8:30 - 9:00 AM	Preliminary Result from the Profiler Certification Exercise at the Virginia Smart Road (Sameer Shetty, VT)
9:00 - 9:30 PM	HPMS Program Update (Robert Rozycki, FHWA)
9:30 - 10:00 AM Break	
Session IX	
Profiler Certification and Construction QA/QC (2 of 2) Moderator: Terry Troutel, WisDOT	
10:00 AM - noon	Open panel meeting on "Practitioners' Review of Smoothness Incentive Programs" Speakers: Matt Ross (Penhall), Doug Lewis (Atlantic Contracting), Sean Nelson (VDOT), and Steve Karimias (UMTRI).
12:00 PM Adjourn RPUG Meeting	
12:00 - 1:00 PM Lunch on Your Own	
ProVAL 3.0 QA/QC Workshop	
1:00 - 4:30 PM	
In this session, learn the basic function of ProVAL 3.0 and how to evaluate new construction QA/QC profiles for localized defects, periodic roughness, and potential measurement quality problems with practical examples. This is limited to 40 participants. Enroll today!!	



Past Smoothness Issues for Project Acceptance (PRI)





Current Smoothness Specifications for Project Acceptance (IRI)

- IRI specifications enforced on all projects as of January 2016
- Contractor's results **still** used in the project acceptance process
- Operator and equipment requires certification
 - Currently, NDOT accepts other state DOTs' certifications such as CalTrans



Current Smoothness Specifications for Project Acceptance (IRI)

- Verification testing performed by NDOT QA personnel
 - Three high speed inertial profiling systems (one for each District)
 - Perform verification testing at 10% (min.) of the contractor's acceptance testing



Current Smoothness Specifications for Project Acceptance (IRI)

- NDOT uses MRI for tenth mile specification and IRI for Localized Roughness specification
- NDOT specifies four different smoothness types for HMA

	MRI	IRI
- Type A	(50 in./mi)	(150 in./mi)
- Type B	(60 in./mi)	(160 in./mi)
- Type C	(80 in./mi)	(175 in./mi)
- Type D	(100 in./mi)	(175 in./mi)

- For PCCP, the specified MRI value is 60 in./mi, and the IRI (Localized Roughness) value is 175 in./mi



Current Smoothness Specifications for Project Acceptance (IRI)

- NDOT specifies a ride incentive/disincentive on the final surface of Interstate routes
- Final surface of HMA
 - Maximum incentive is \$600.00 per tenth of a mile
 - Incentive is based upon the initial measured MRI
 - Tenth of a mile section has an MRI ≤ 44.999 in./mi
 - No areas of Localized Roughness > 150.000 in./mi
 - No defects in excess of 0.25 in. as measured with a straightedge



Current Smoothness Specifications for Project Acceptance (IRI)

- Final surface of HMA
 - Maximum disincentive is \$600.00 per tenth of a mile
 - Grinding of areas with an MRI from 55.000 to 74.000 in./mi will only be allowed
 - If any tenth of a mile sections have areas of Localized Roughness > 150.000 in./mi
 - If any tenth of a mile sections have defects in excess of 0.25 in. as measured with a straightedge
 - Liquidated damages of \$1,000.00 will be assessed for each such area and/or defect not corrected
 - Contractor must correct if MRI is ≥ 75 in./mi



Current Smoothness Specifications for Project Acceptance (IRI)

- Final surface of PCCP
 - Maximum incentive is \$1,600.00 per tenth of a mile
 - Incentive is based upon the initial measured MRI
 - Tenth of a mile section has an MRI ≤ 59.999 in./mi
 - No areas of Localized Roughness > 175.000 in./mi
 - No defects in excess of 0.25 in. as measured with a straightedge

Current Smoothness Specifications for Project Acceptance (IRI)

- Final surface of PCCP
 - Maximum Disincentive is \$1,600.00 per tenth of a mile
 - Tenth mile sections with an MRI of 76.000 to 95.999 in./mi may be corrected to eliminate disincentive
 - Tenth mile sections with an MRI ≥ 96.000 in./mi must be corrected by the contractor
 - Tenth mile sections containing Areas of Localized Roughness > 175.000 in./mi or defects in excess of 0.25 in./mi as measured with a straightedge must be corrected by the contractor

Inertial Profiling Equipment Utilized by NDOT



05.11.2016

Inertial Profiling Equipment Utilized by NDOT



Inertial Profiling Equipment Utilized by NDOT





NDOT Certification Program

- NDOT is in the process of developing a certification program
 - Program will be administered by the QA section of the Construction Division
 - Certification will consist of a written exam and a performance verification of the proposed operator and equipment
 - Certification of both operator and corresponding equipment will be valid for one year

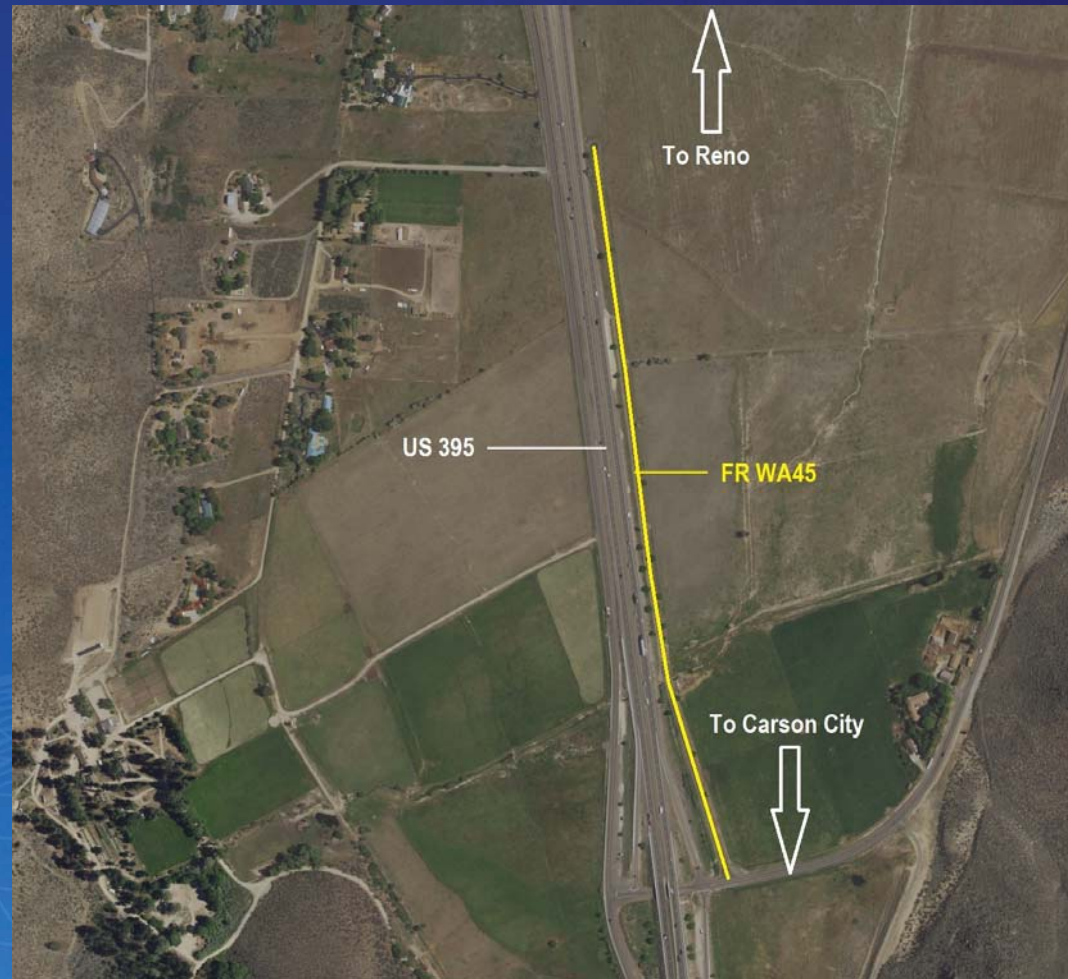


NDOT Certification Program

- NDOT is in the process of developing a certification program
 - Certification site is located on a frontage road along US 395 in Washoe Valley
 - Certification track is 2,000 ft. in length
 - A 2" HMA overlay was placed during the spring of this year
 - Either a SurPro 4000 (ICC) or a CS8800 (SSI) walking profiler will be used to establish a baseline profile along the certification track



NDOT Certification Program





NDOT Certification Program





NDOT Certification Program





NDOT Certification Program





What the Future Holds

- NDOT will participate in TPF-5(354), “Improving the Quality of Highway Profile Measurement”
- NDOT will implement their certification program in the Spring of 2017
- NDOT will continue to evaluate their specifications, policies, and procedures
 - Based on the continual evaluation, adjustments will be made as necessary

Questions?

Thank you!