2006 RPUG
Changing from PI to IRI
Colorado DOT Experience
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Current Specification

• Since 1999 CDOT has used the profilograph for pavement smoothness quality
• Incentives based on the average PI for each lane in 0.10 mile increments.
• PI based on the 0.10 inch blanking band
Current Specification

• Contractors perform all testing with CDOT inspectors observing the testing.
• CDOT certifies contractor profilographs on a certification site.
• CDOT didn’t have a profilograph to QA the contractor results
Problems with PI

- Project Engineers complained that PI numbers did not correlate to how the pavement road.
- PI numbers were not repeatable between various profilographs.
- CDOT couldn’t verify contractor results
Can PI be Improved

- A CDOT & industry task force was formed to investigate a better way of measuring smoothness in late 2001.
- Originally focused on changing to a 0.0 inch blanking band for PI and how to adjust the specification limits.
- In 2002, the focus switched to high speed profilers & IRI.
Investigating IRI

- 2002 CDOT attended the joint FWDUG/RPUG in Roanoke to meet with vendors of profilers.
- 2003 CDOT obtained funding to proceed with purchasing a HSP
- 2003 CDOT joined the TPF- 5(063) “Improving the Quality of Pavement Profiler Measurement” study.
HSP Procurement

- CDOT invited vendors to demonstrate their HSPs & pre-qualify for bidding.
- Two vendors, Dynatest & ICC participated.
- Each vendor showed that their HSP met the requirements of AASHTO MP-11.
- Required to be certified in Texas prior to delivery.
- ICC was awarded as the low bidder.
- December 2003 HSP is delivered.
2004 Initial Testing

- Tested as many projects as possible with the HSP to become familiar with the technology & what the IRI numbers meant.
- Allowed contractors to schedule the HSP to compare with their profilograph.
- Hope for a PI vs IRI correlation quickly faded.
- IRI limits were set for a pilot specification for the 2005 construction season.
- Moved forward despite lack of an IRI “Must Grind” locator.
2005 Pilot Specification

- CDOT would test for acceptance and incentive payments on final pavement surface.
- Incentive paid in 0.10 miles sections.
- Maximum incentive of $2252.80/mi for HMA & $9,856.00/mi for PCCP
- PCCP IRI levels were increased by 15 in/mi to account for longitudinal tining
- Disincentive payment were reduced by 1/2
2005 Pilot Specification

- 11 HMA projects & 1 PCCP project
- Most projects earned incentives
- The contractor was required to use a profiler for QC.
- The contractor was required to fix all corrective work areas prior to CDOT measuring for pay.
- Each lane measured 3 times & the IRI averaged
2005 Successes

- Projects were smoother compared to 2004
- CDOT project engineers reported that the contractor was taking more care to paving smooth.
- Contractor QC results & CDOT QA results matched within 2-3 IRI
2005 Lessons Learned

- A “must grind” locator was needed.
- Exclusions in urban percent project caused problems.
- Does not work well on tined concrete pavement.
- Contractors wanted a correlation site so they could trust that their QC results match CDOT’s QA results.
- CDOT project engineers/inspectors needed training.
- Profiler Certification needed.
2006 Pilot Specification Changes

- PCCP goes back to the profilograph.
- Switch to Half-Car IRI to take advantage of ProVAL 2.6’s “Must Grind” locator (25 ft continuous HRI)
- Percent improvement no longer has exclusions
- Required corrective work on lower pavement layers to avoid grinding on top mat.
2006 Successes

• More contractors have profilers. (mostly ICC)
• Colorado profiler user group established with the contractors
• Specification training for engineers & contractors
• Pavement smoothness has increased
  – 2005 HRI average of 49.0 in/mile
  – 2006 HRI average of 42.3 in/mile
2006 Lessons Learned

• Slight differences in CDOT & contractor localized roughness areas.
• Exclusion area limits need to be extended.
• Profiler Certification needed for CDOT & Contractor.
• Some asphalt recycling processes are not capable of building smooth roads.
• Requiring corrective work on lower pavement layers was a huge burden on the contractor.
• The New Mexico DOT has a profiler certification program the CDOT can pirate.
Changes for 2007

- Specification will be standard on all HBP projects.
- Profiler certification program will be developed prior to the 2007 paving season.
- Profiler operators will be certified
- Contractor will not be required to fix corrective work areas on lower layers
- Contractor cannot perform elective corrective of final layer to lower disincentive
Changes for 2007

• CDOT will designate areas requiring corrective work.
• The contractor will fix these areas and retest the areas with their profiler.
• The contractor will demonstrate to the project engineer that the corrective work areas have been fixed.
• Raised the localized roughness threshold for corrective work
Changes for 2007

• PCCP projects will be tested with CDOT’s profiler.
• ProVAL’s profilograph simulation will be used to determine the PI.
• Contractors will be required to perform QC with a profilograph or profiler.
Future Changes

• PCCP to HRI
• Reevaluate the HRI levels for incentive
• Raise the available incentive
• Using a standard program for calculating HRI (ProVAL?)
• Contractor measurements used for pay with CDOT HSP used for quality assurance
Questions?