9th International Conference on MANAGING PAVEMENT ASSETS (ICMPA9)

Implementing (Bleeding) Standards for Pavement Data Collection

RICK MILLER, Pavement Management Engineer, Kansas Dept. of Transportation

AASHTO THE VOICE OF TRANSPORTATION

VirginiaTech Transportation Institute

TRB

U.S. Department of Transportation Federal Highway Administration

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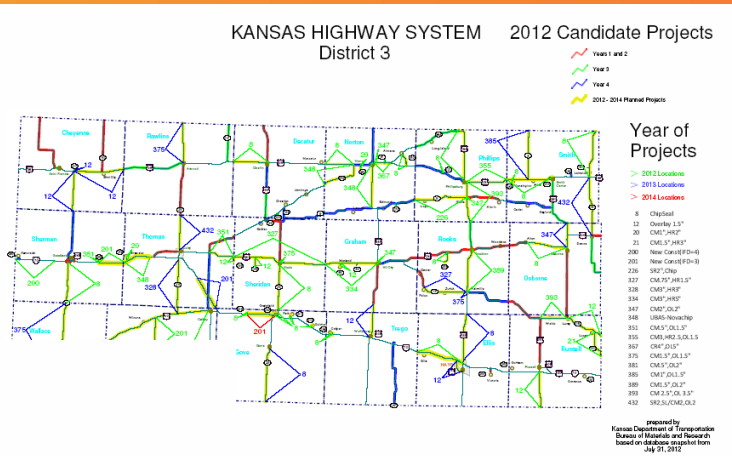
VDOT Virginia Department of Transportation

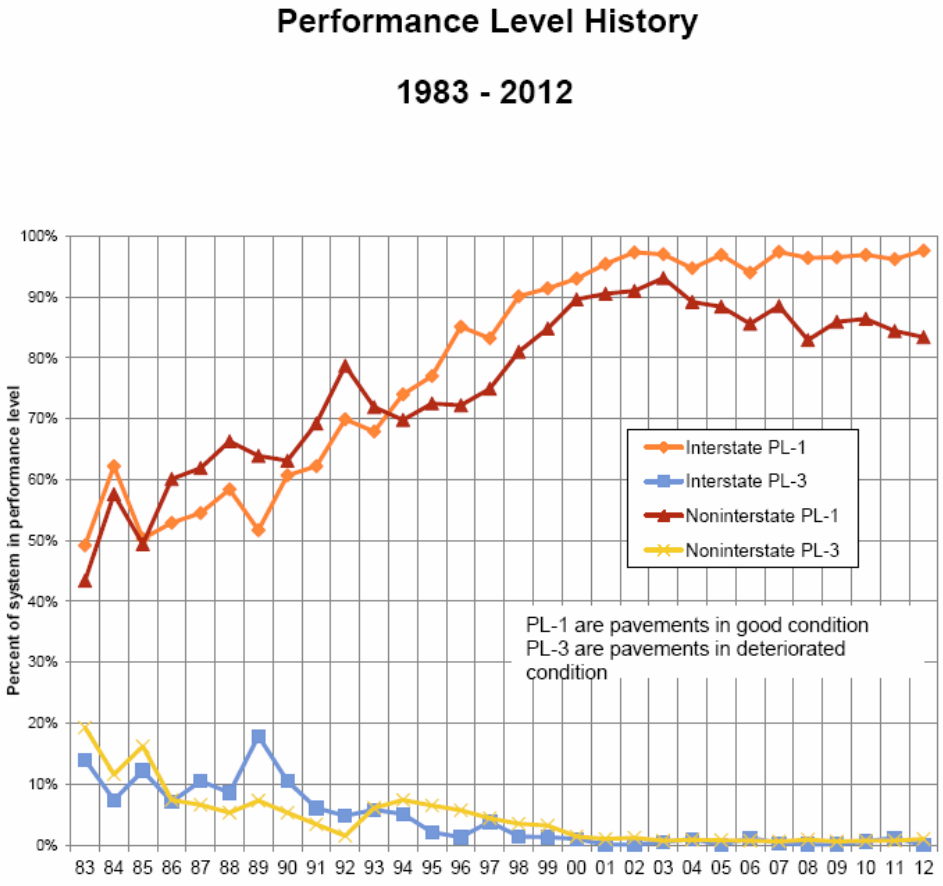
About the Presenter

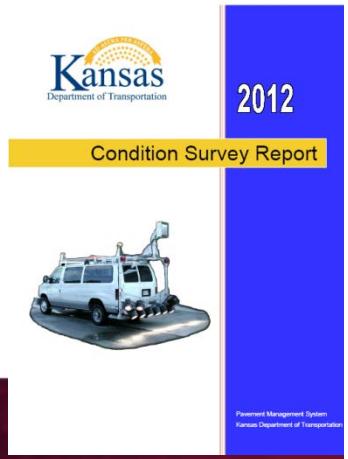
- **Rick Miller**
  - Kansas Department of Transportation – Pavement Management Engineer
    - Since 1998
  - Statewide Planning Engineer/Associate
    - 1988-1998
  - Active in TPF-5(299) Improving the Quality of Pavement Surface Distress and Transverse Profile Data Collection and Analysis (2013 - Present)
  - Active in Expert Task Group for Rutting and Cracking (2008 - 2013)
  - Active Opponent of National Pavement Data Collection Standards (1998 - ????)

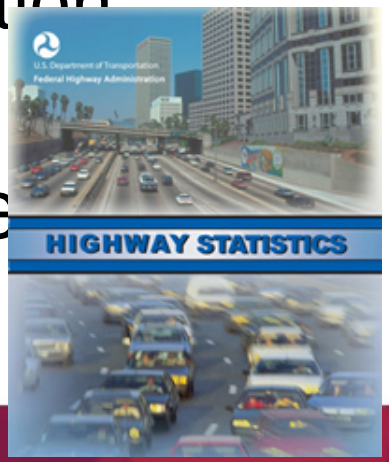
Uses of Pavement Condition Data

- Reports (Annual NOS, HP
- KDOT Performance Meas
- Projec
  - "Maj
    Reha
  - "Sub









Data KDOT Collected

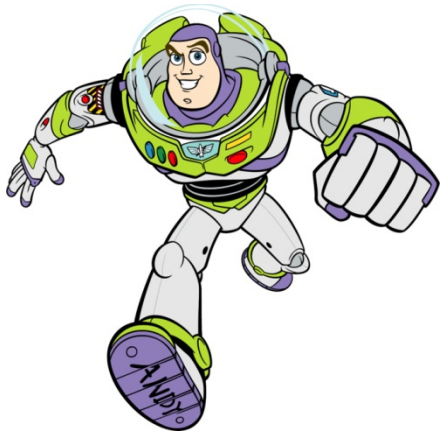
- Roughness (IRI) (all pavement types)
- Cracking (Transverse, Fatigue, Block) (Black surface)
- Rutting (3 point) (Black surface)
- Joint Distress (“D-Cracking”) (White surface)
- Faulting (White surface)
- Location (GPS) Data (all pavement types)

KDOT Methods of Data Collection

- Automated (60 or more MPH)
  - 3 point profiler (roughness, rutting, faulting)
  - Nearly 100% sample of each segment
  - DGPS
- Manual (5-10 MPH in 100 foot sections)
  - “Windshield” (cracking, joint distress)
  - Three 100 foot samples per (nominally 1 mile) segment (~5% sample)

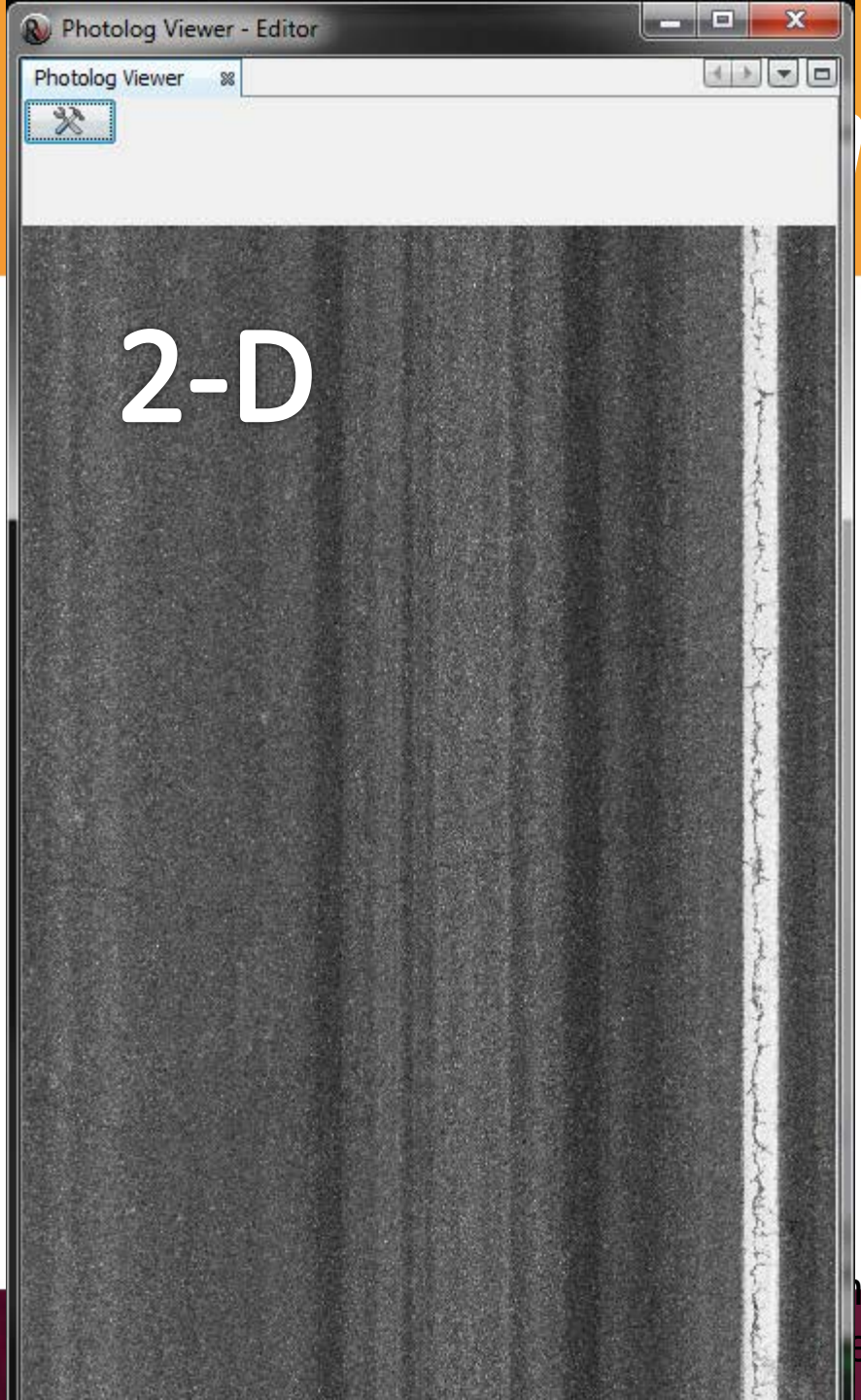
"New" Requirements To 2013 and Beyond….

- KDOT – adapt new data to fit old criteria and/or shift to new data
- AASHTO – Produce data "exactly" following the published standards (full disclosure of ETG)
- HPMS – Produce data following the standards (if the standards don't make sense, get them changed!)



Data KDOT Collects

- Wheelpath Profiles
- Forward Images
- Transverse Profiles
- Downward Images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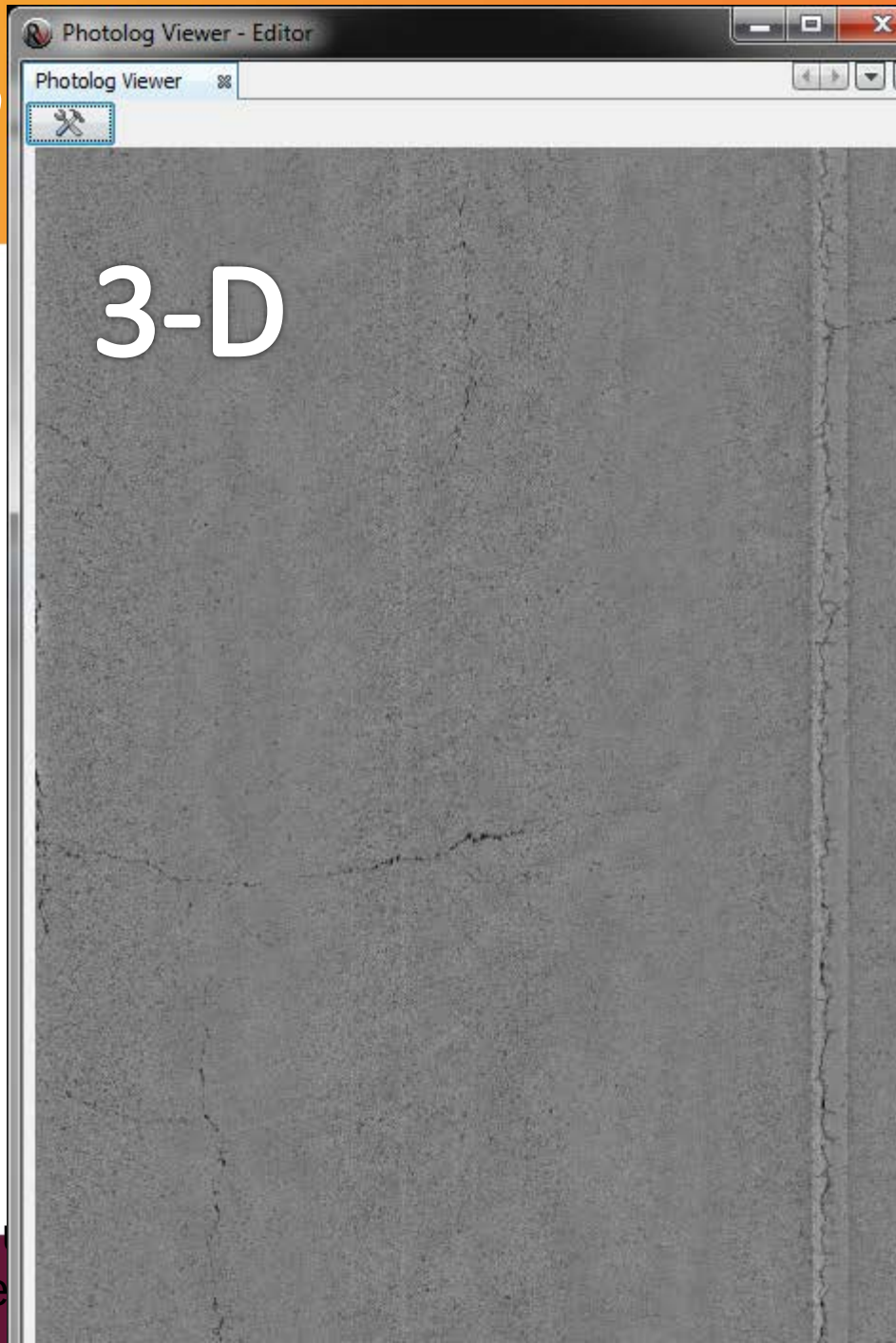
Photolog Viewer
2-D


Photolog Viewer - Editor
Photolog Viewer
3-D

AASHTO Standards

Standard Practice for

Collecting Images of Pavement Surfaces for Distress Detection

AASHTO Designation: PP 68-10

Standard Practice for

Quantifying Cracks in Asphalt Pavement Surfaces from Collected Images Utilizing Automated Methods

AASHTO Designation: PP 67-10

Standard Practice for

Collecting the Transverse Pavement Profile

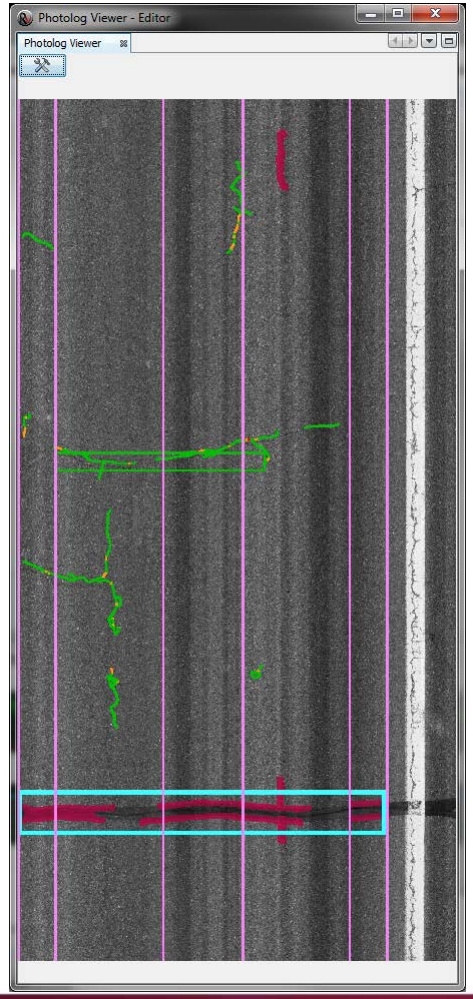
AASHTO Designation: PP 70-10

Standard Practice for

Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles

AASHTO Designation: PP 69-10

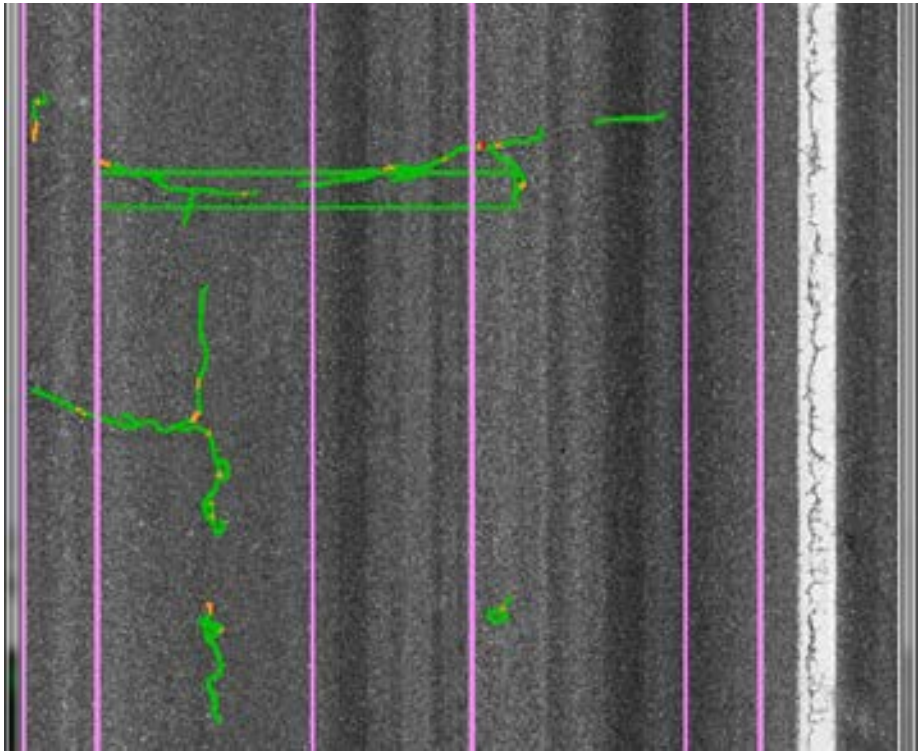
Automated Crack Detection



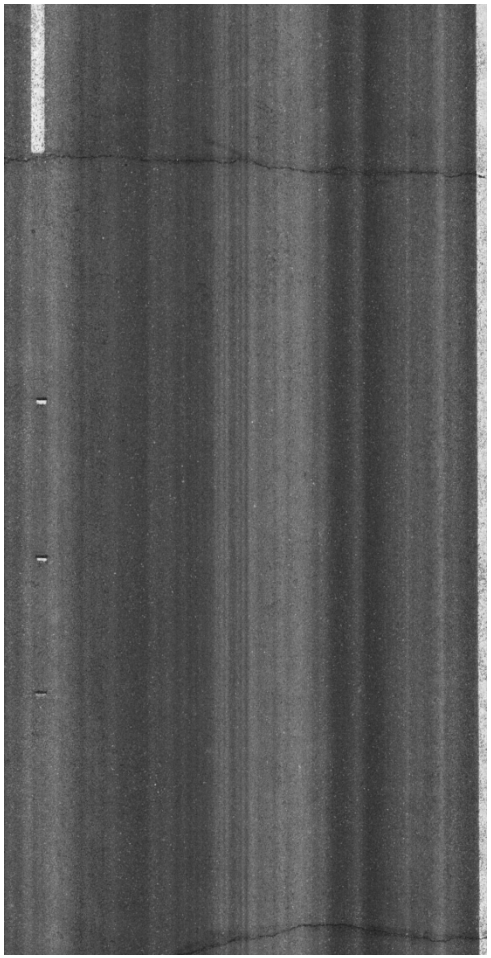
- What are the dimensions of the smallest crack of interest?
- What meta data do we need regarding cracks?
  - Location
  - Extent
  - Width
  - Orientation
  - Etc.
- How should we report cracking?

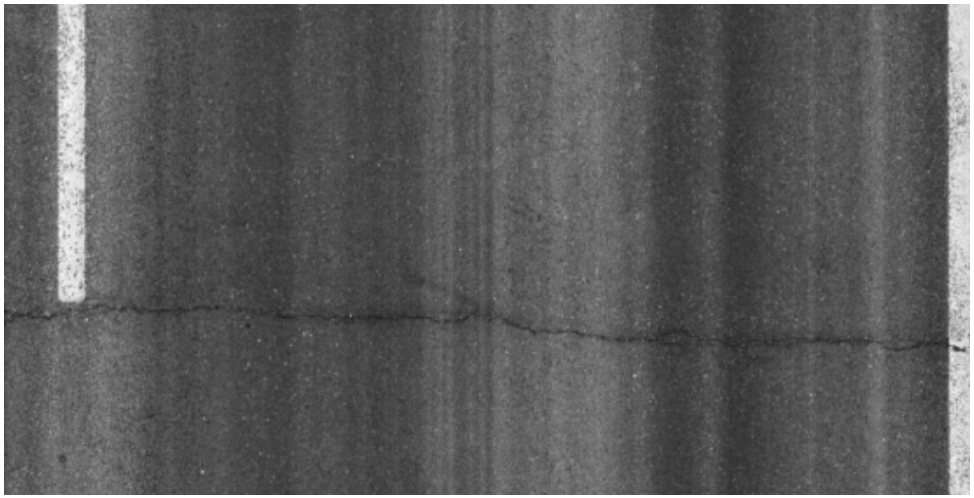
Cracking Analysis Standard

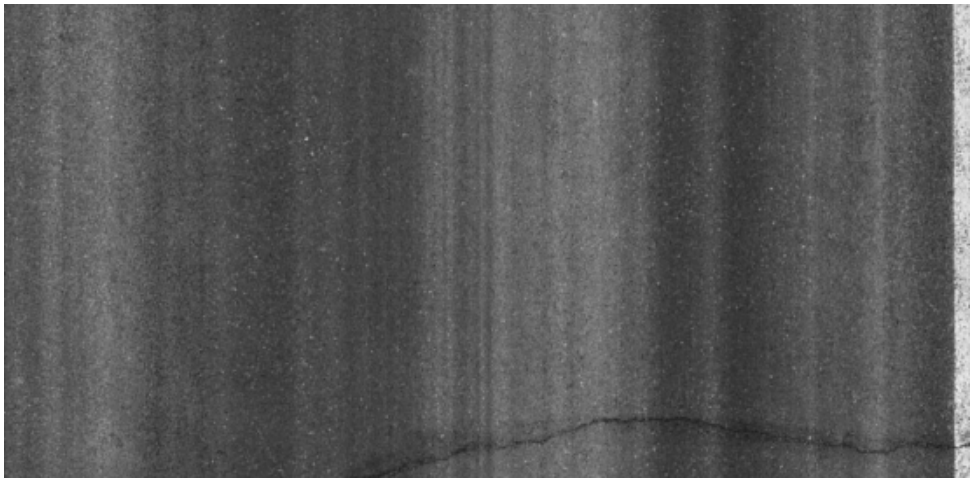
- Uses 5 zones
- Classifies into 3 types
  - Longitudinal
  - Transverse
  - Pattern/Area
- Total length(s) and Average Width(s)



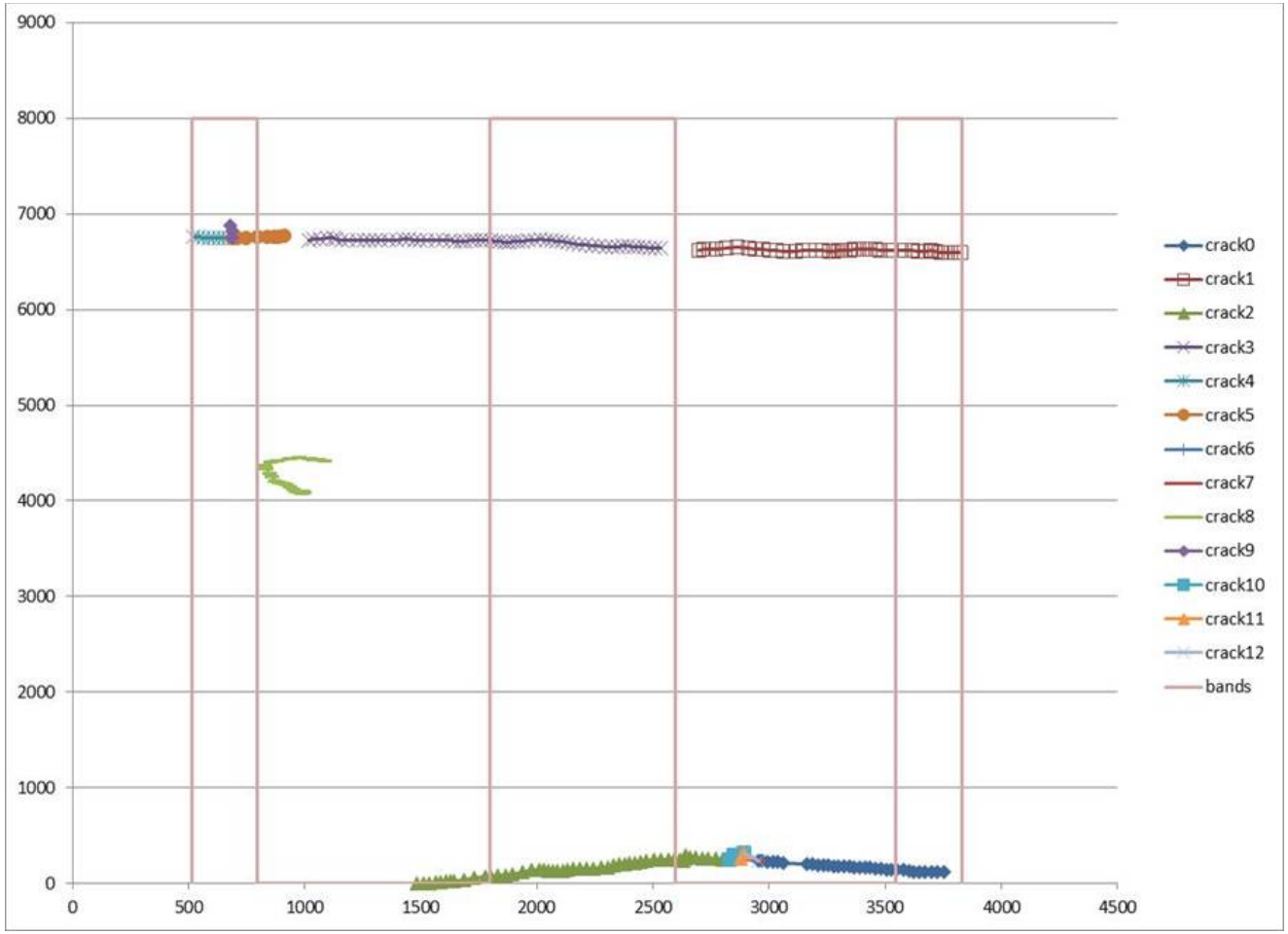
Applying the cracking standard



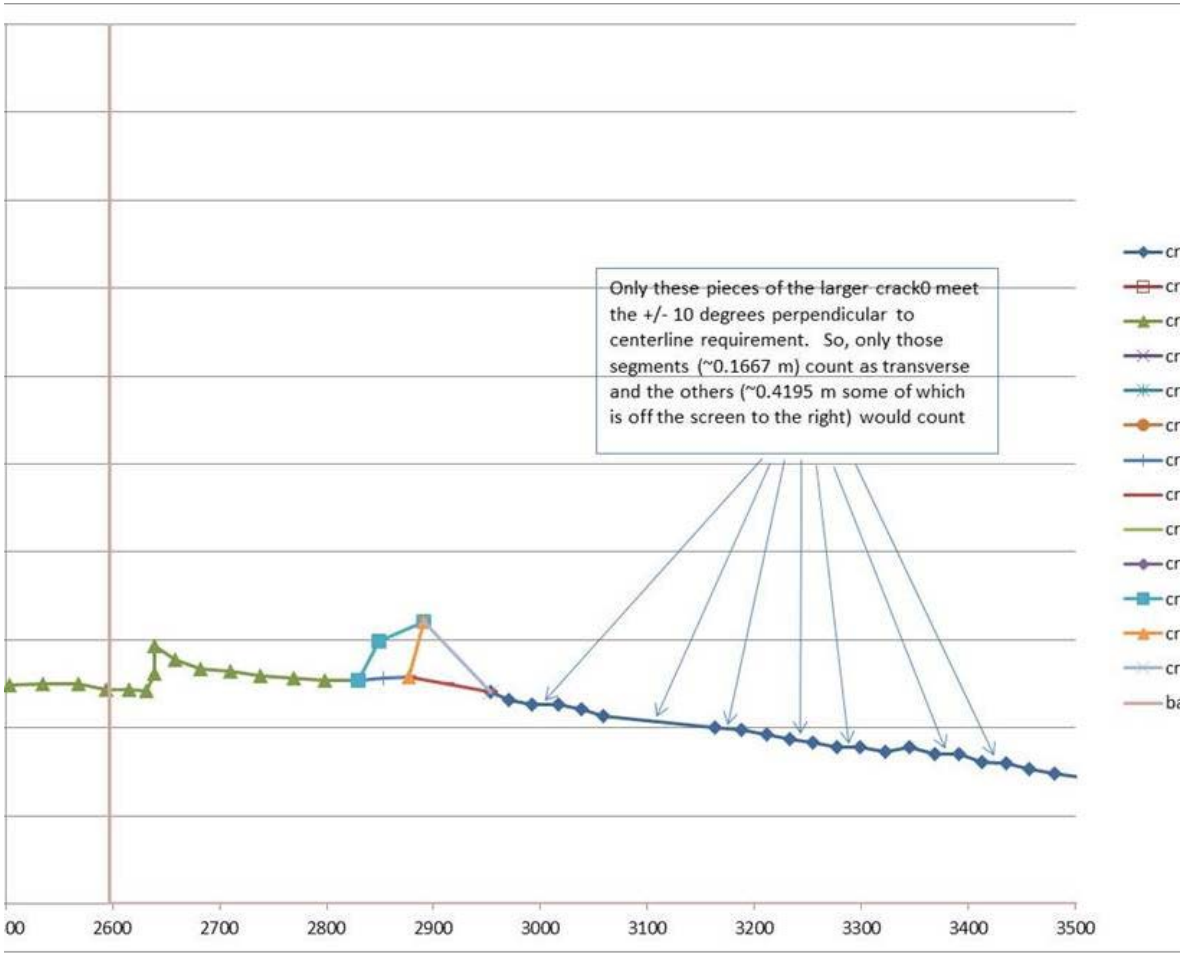




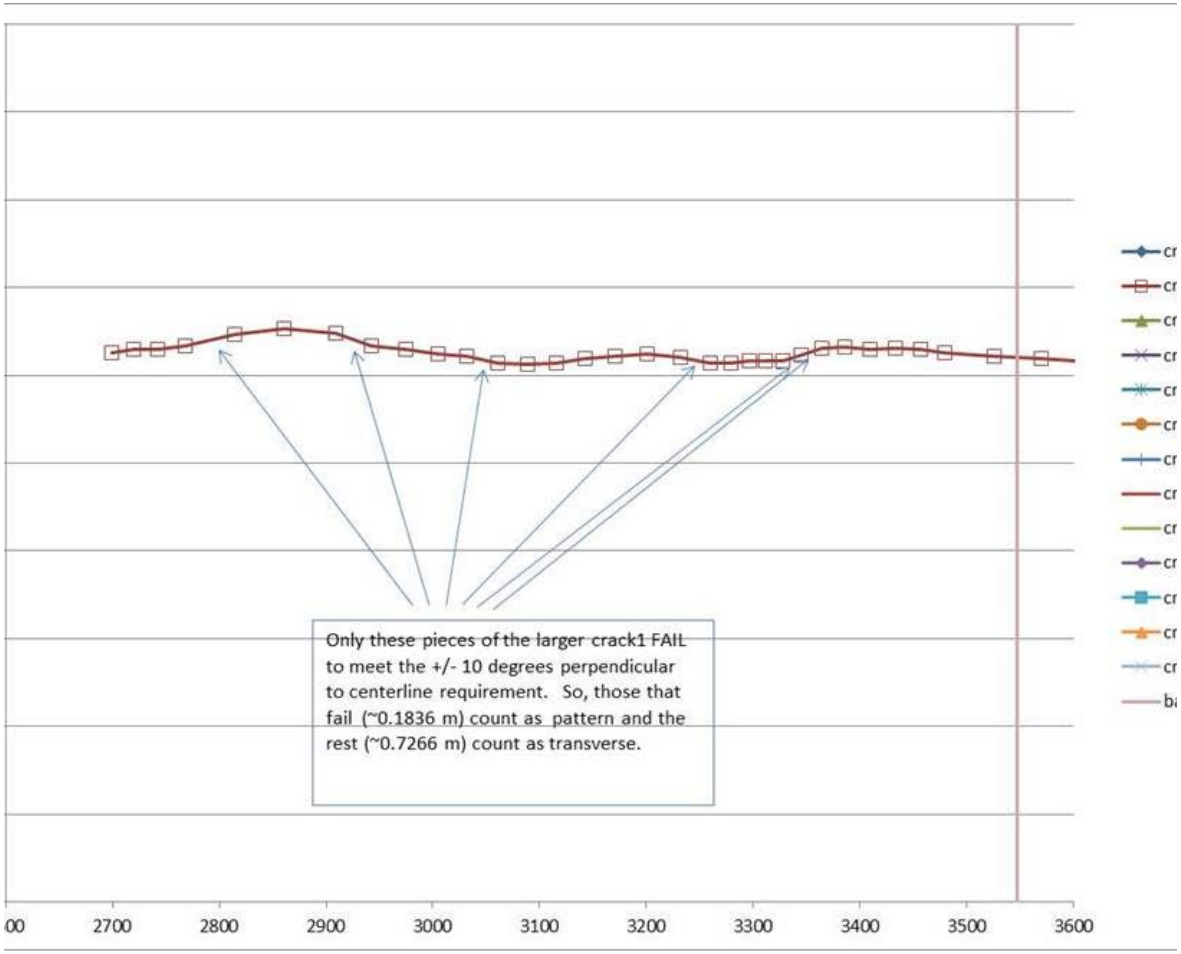
Not 2 cracks but more like 13



Not just transverse either

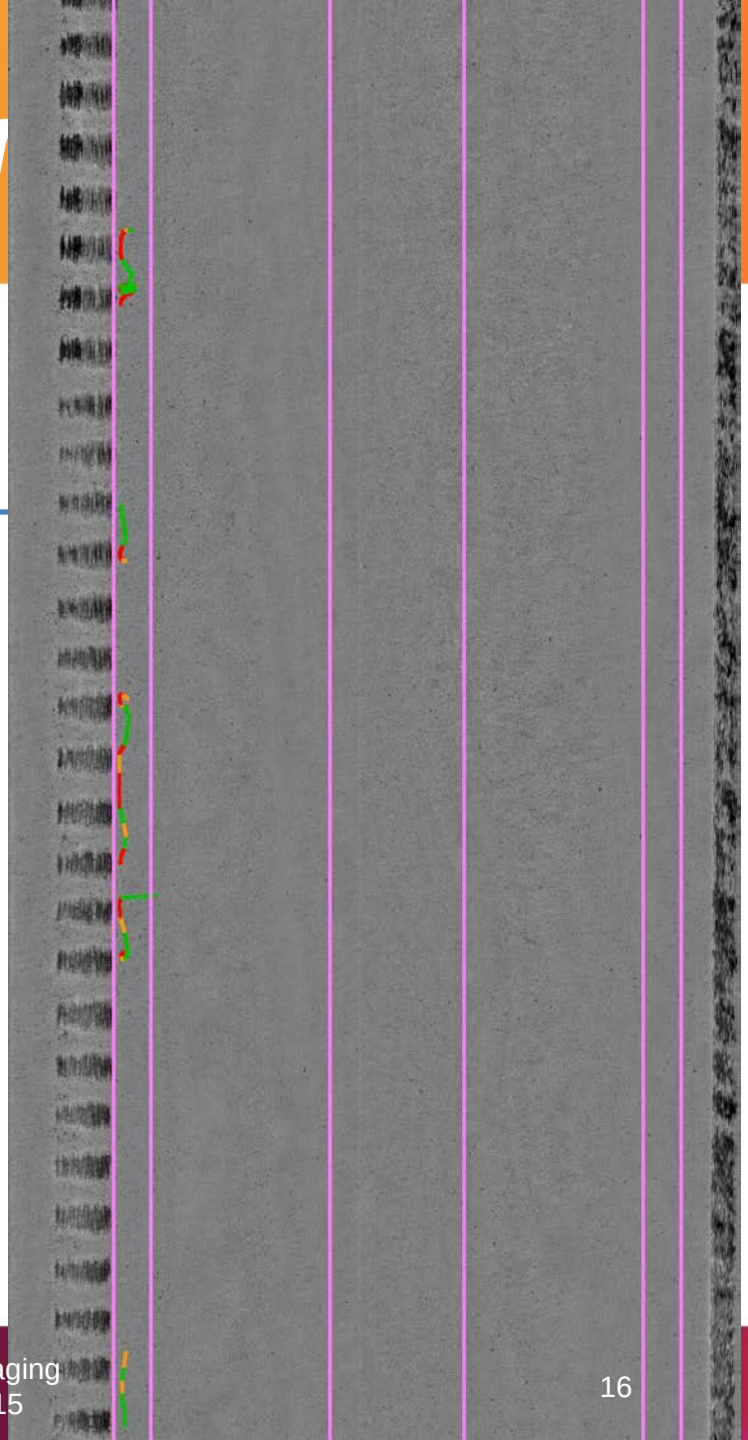


Pattern in the mix



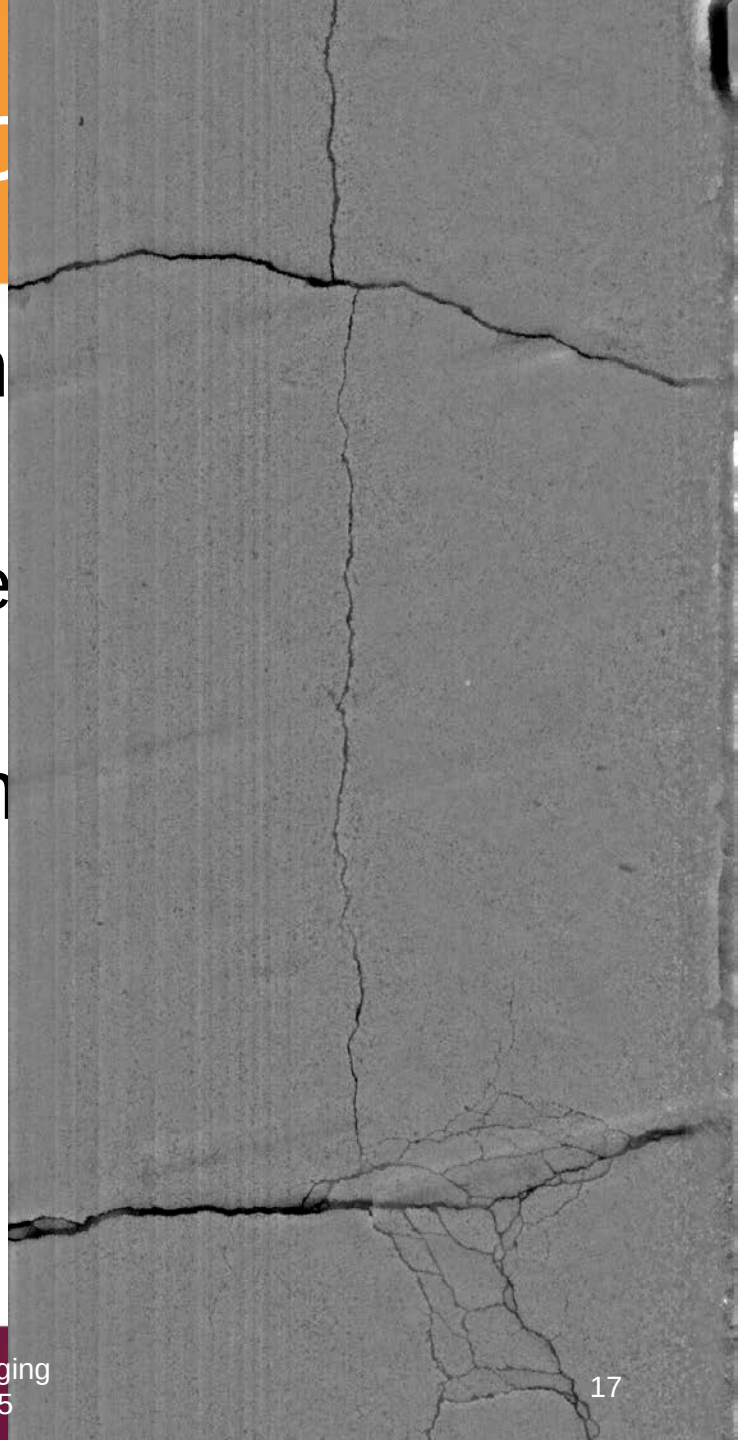
AASHTO Standard cr

- Length of Cracks
  - By Zone
  - By Type
- Average Width
  - By Zone
  - By Type



Is that enough info

- Kansas says okay for Tran
  Longitudinal
  - (would like more info like de
    transverse)
- May need more for Pattern



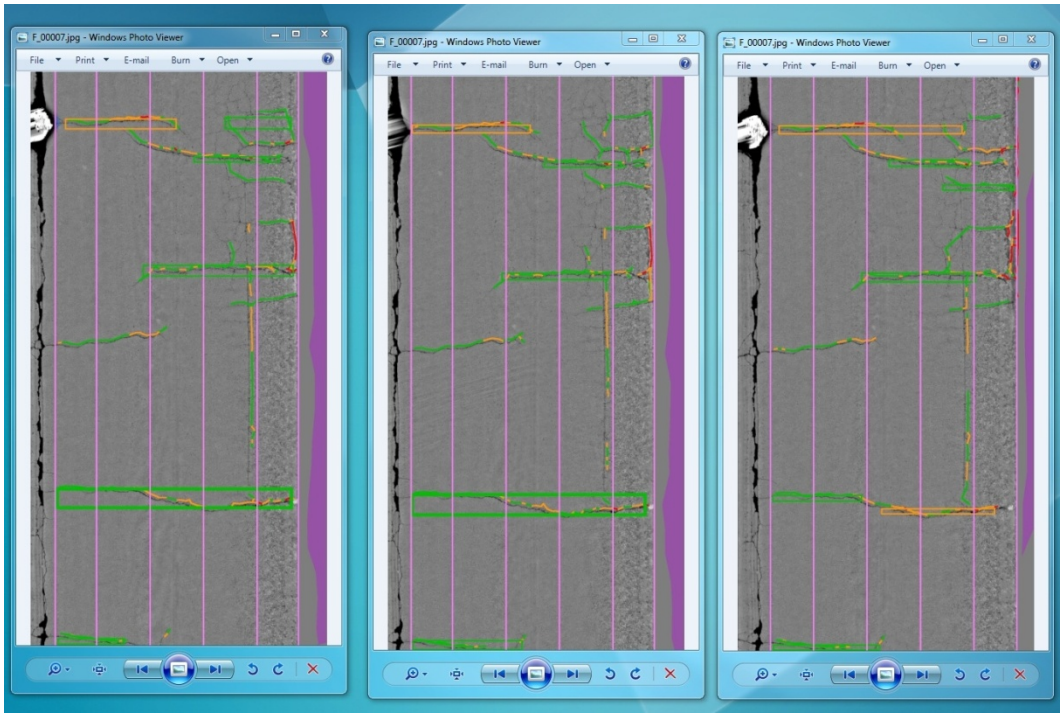
Is that enough info

- Kansas says okay for Tran
  Longitudinal
  - (would like more info like de
    transverse)
- May need more for Pattern
  - (area may be needed to ma
    pattern meaningful)
- Need to do Some Math for
- May Need to Repeat for Se

Rick's suggestions

- Standards are a Good Start
- Twist Our Brains Around Definition of Crack
- Apply Output from Standards
- Better Define Zones
- Address Area for Pattern Cracks (maybe transverse too)
- Incorporate Sealed Cracks Better

Questions?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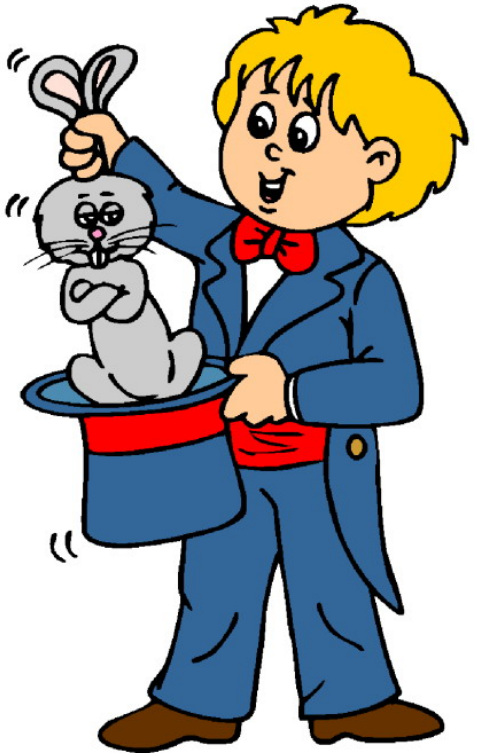
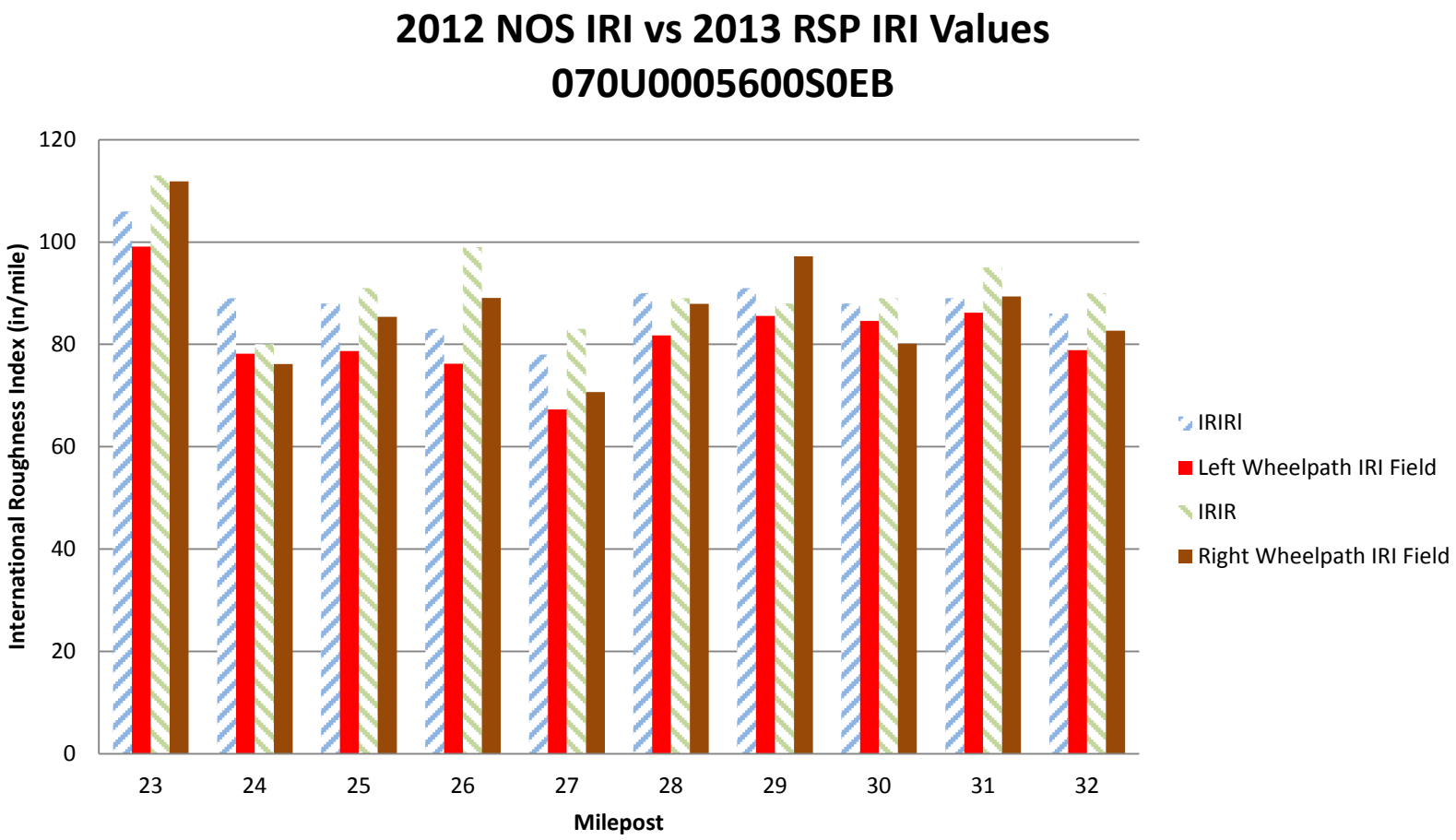


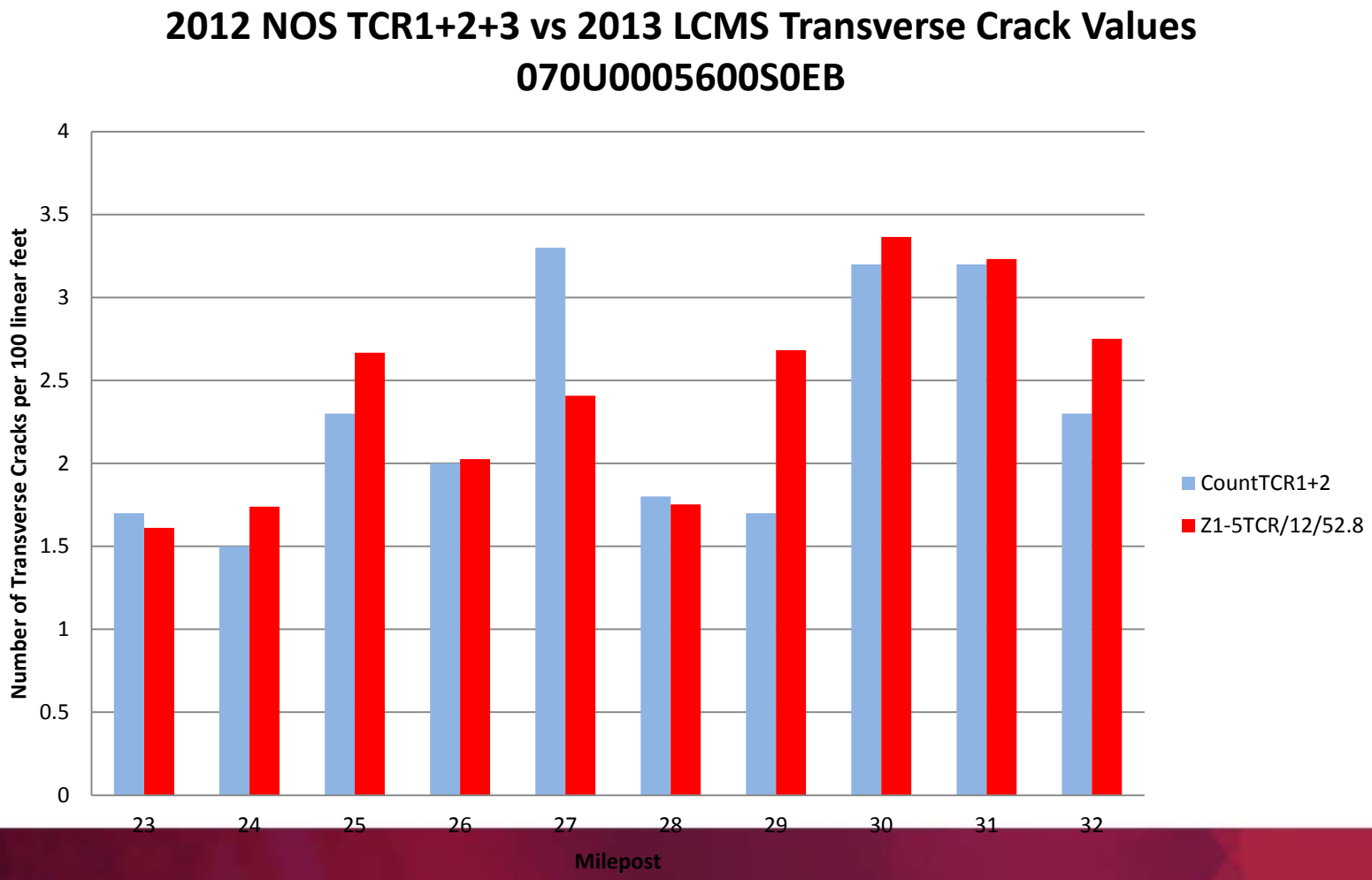
KS automated experience

Items Suggested to Asses in Existing AASHTO Provisional Standards and KS Verification – Miller, KS

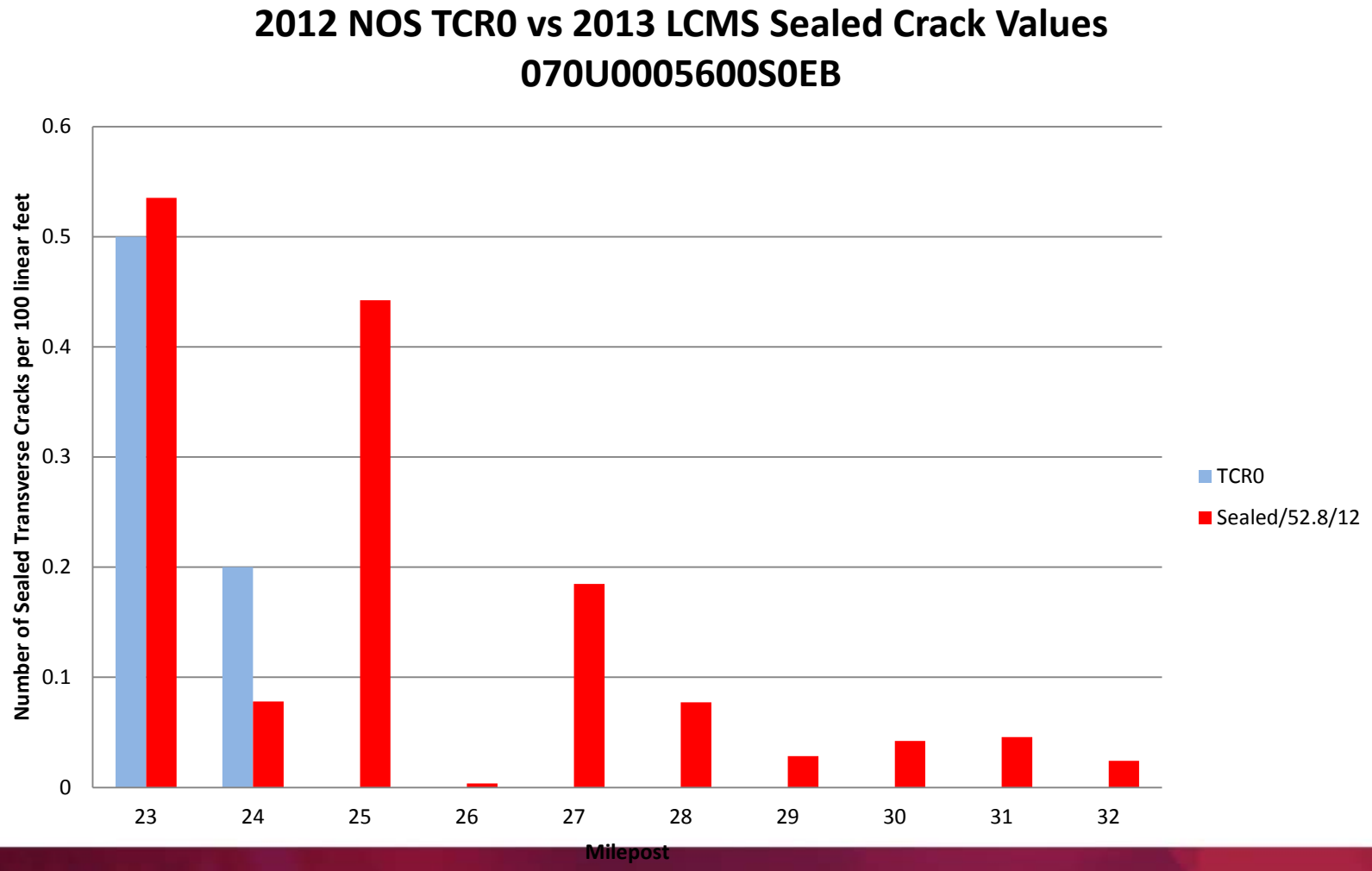
2012 NOS vs 2013 RSP IRI



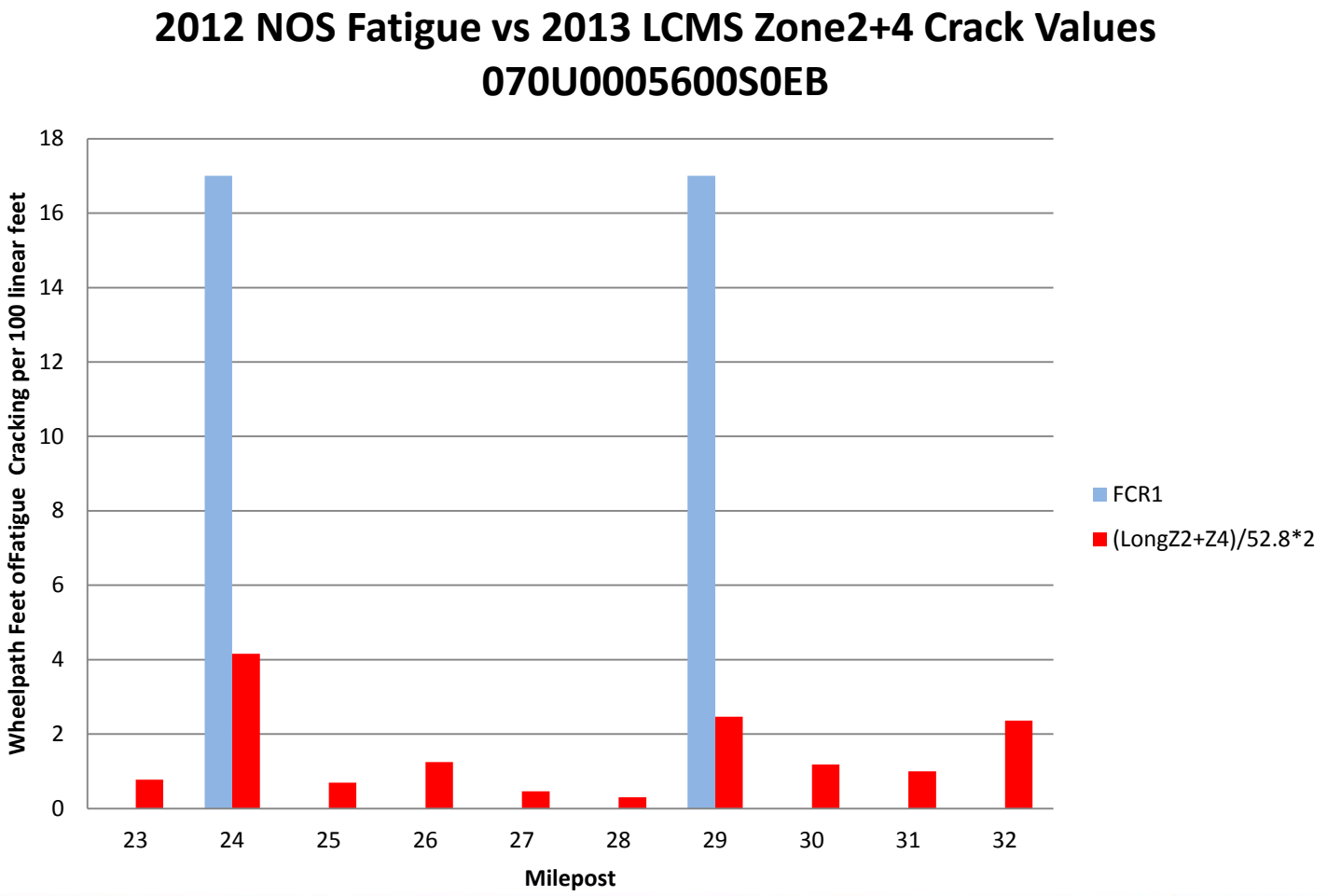
Comparing Transverse Cracks



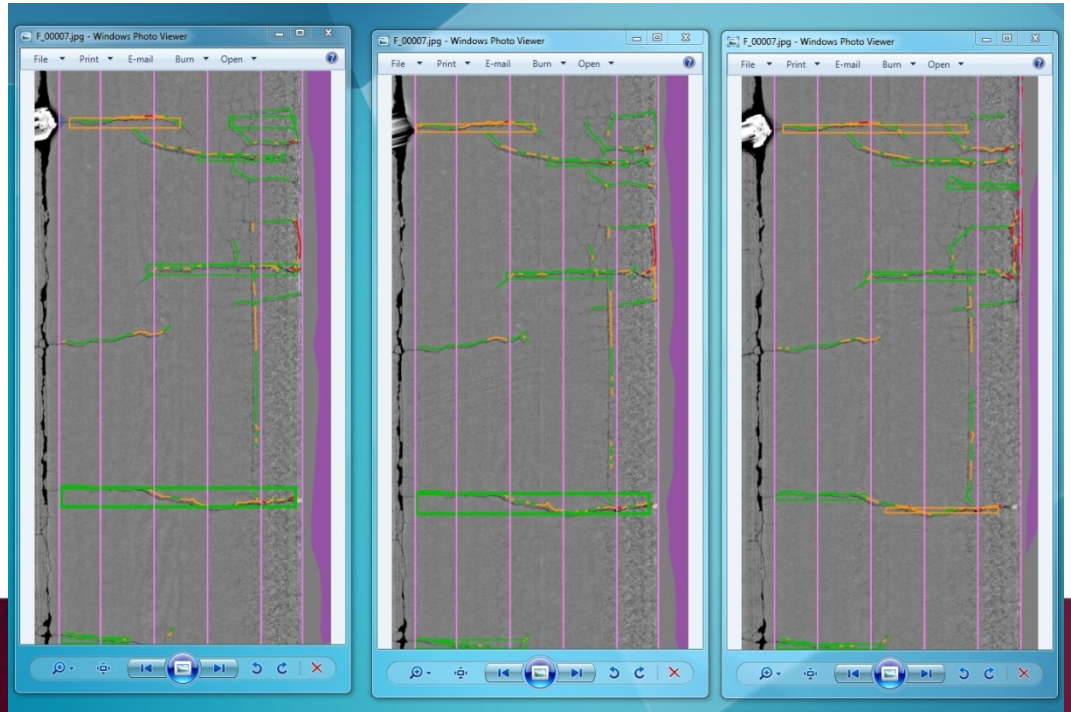
2012 NOS Sealed Transverse vs LCMS Sealed Cracks

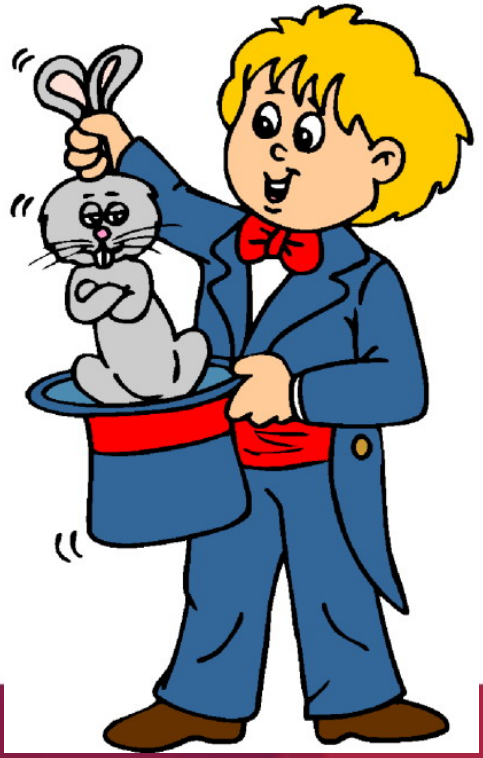


Fatigue Cracking Comparison



Lessons Learned?





Title

- **Content Level 1**
  - Content Level 2
    - Content Level 3

Presentation Topics

- **(Bleeding) Standards**
  - PP-68 “Collecting Images of Pavement Surfaces for Distress Detection”
  - PP-67 “Quantifying Cracks in Asphalt Pavement Surfaces from Collected Images Utilizing Automated Methods”
  - PP-70 “Collecting the Transverse Pavement Profile”
  - PP-69 “Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles”
  - HPMS
- **Implementation**
  - Kansas Pavement Management History
  - Content Level 2
    - Content Level 3

Subtitle

TITLE OF SECTION

Title

- Content

- Content

Title

Subtitle

- Content

Subtitle

- Content

Title

Following Standards

- AASHTO R 43 Quantifying Roughness
- AASHTO R 48 Determining Rut Depth
- AASHTO R 36 Evaluating Faulting
- AASHTO PP 68 Collecting Images of Pavement Surfaces
- AASHTO PP 67 Quantifying Cracks from Images
- AASHTO PP 70 Collecting the Transverse Profile
- AASHTO PP 69 Determining Pavement Deformation from Transverse Profiles

Following Standards

- AASHTO R 43
- AASHTO R 48
- AASHTO R 36
- AASHTO PP 68
- AASHTO PP 67
- AASHTO PP 70
- AASHTO PP 69

- Quantifying Roughness
- Determining Rut Depth
- Evaluating Faulting
- Collecting Images of Pavement Surfaces
- Quantifying Cracks from Images
- Collecting the Transverse Profile
- Determining Pavement Deformation from Transverse Profiles