

Pavement Evaluation 2019



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Roanoke, Virginia

Assessment of Jointed Concrete Pavement Using Continuous Deflection

Jerry Daleiden, P.E.
ARRB Group, Inc.

Evolution of PCC Structural Assessments

Three goals:

1. Review challenges/pitfalls of
 - A. Traditional assessments
 - B. Original TSD on PCC
2. Share recent findings
3. Review case studies and potential implications

“Rigid Pavements”

- By definition are intended to be VERY stiff.
- Should (by design) have very little deflection.
- We are seeking the exceptions.
 - **“The needles in the haystack”**

Continuous vs. Sampled

Pavement Assessment historically “Sample” based

Pavement conditions, vary along roadways

- Ride
- Density (Intelligent Compaction, Infrared, GPR)
- Segregation (Texture)
- Structural Integrity (TSD, GPR)

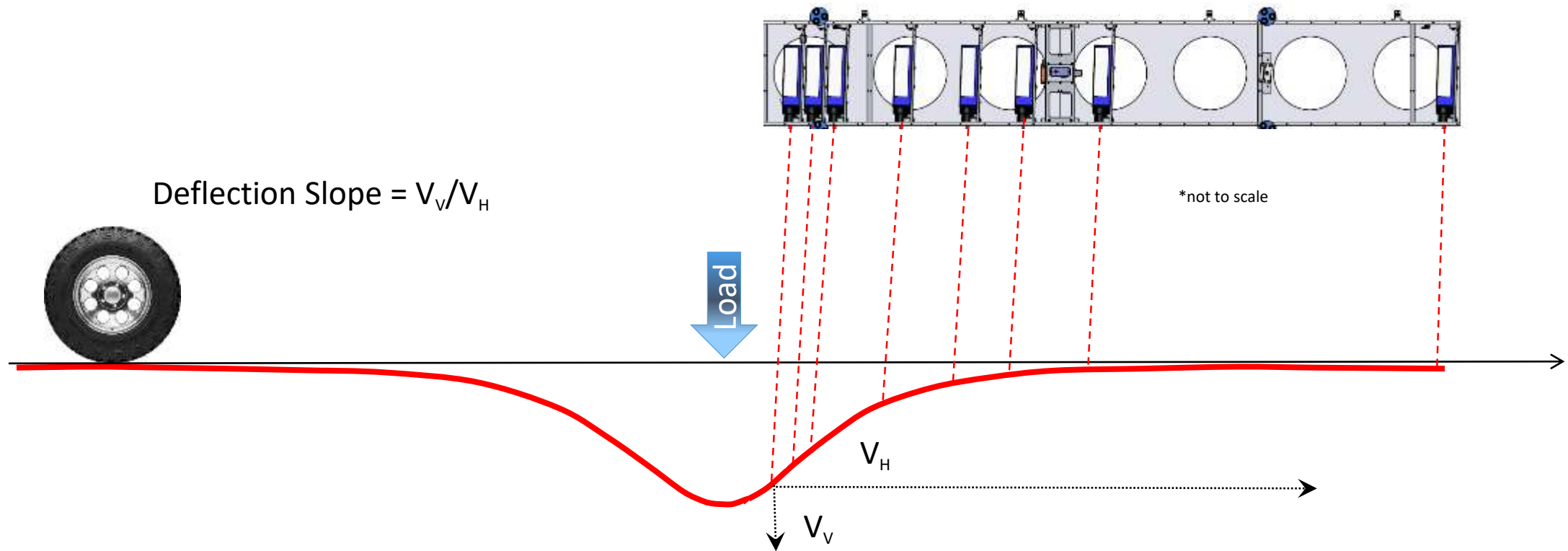
Traditional Strength Measurement



Structural Assessment - Evolved



Continuous Deflection Measurement



Maximum Deflection -

Navigation controls including back, forward, and zoom buttons. A scale bar shows 60 units. A red 'Forward' button is highlighted. A value of 15.262 is displayed next to the button.

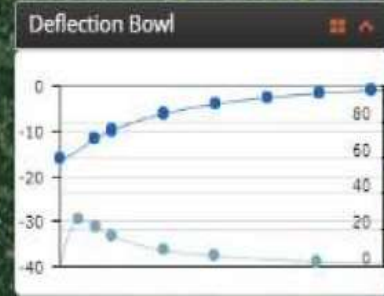
Map controls including a search icon and a 'Map: Satellite' dropdown menu.

Video 1x 2x 3x



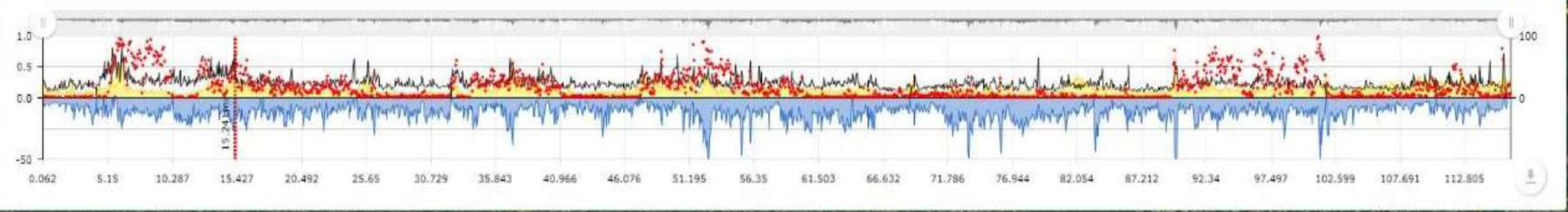
↑ Road Id: 60

Start Chainage:	11.95 mi
End Chainage:	12.01 mi
IRI_L0:	73.5
Lane:	0
Project:	Virginia 2017
Less...	
DO (mils)	-14.91122147
IRI Left	93.77
IRI Avg	83.64
IRI Lane	70.33
Rut Left (in)	0.053
Width Right (in)	90.192
Width Left (in)	65.54262
Cross Section Right (sq in)	4.770571



Road ID 60 Forward -

iPAVe - Select Comparison Data -



Maximum Deflection (D0) ▾

Navigation controls including back, forward, and search buttons. A search box contains the text "Enter road ID." and a "Forward" button with a truck icon. A numerical input field shows the value "0".

Create Advanced Filter Query

Select Filter

IRI Right

<=

100

[-] [+]

Deflection

SCI 300

SCI 200

SCI Sub

Maximum Deflection (D0)

Apply

Disable

Save

Cracking

Cracking Percentage

Rutting

Rut Right

Rut Left

Roughness

IRI Right

IRI Left

IRI Ave

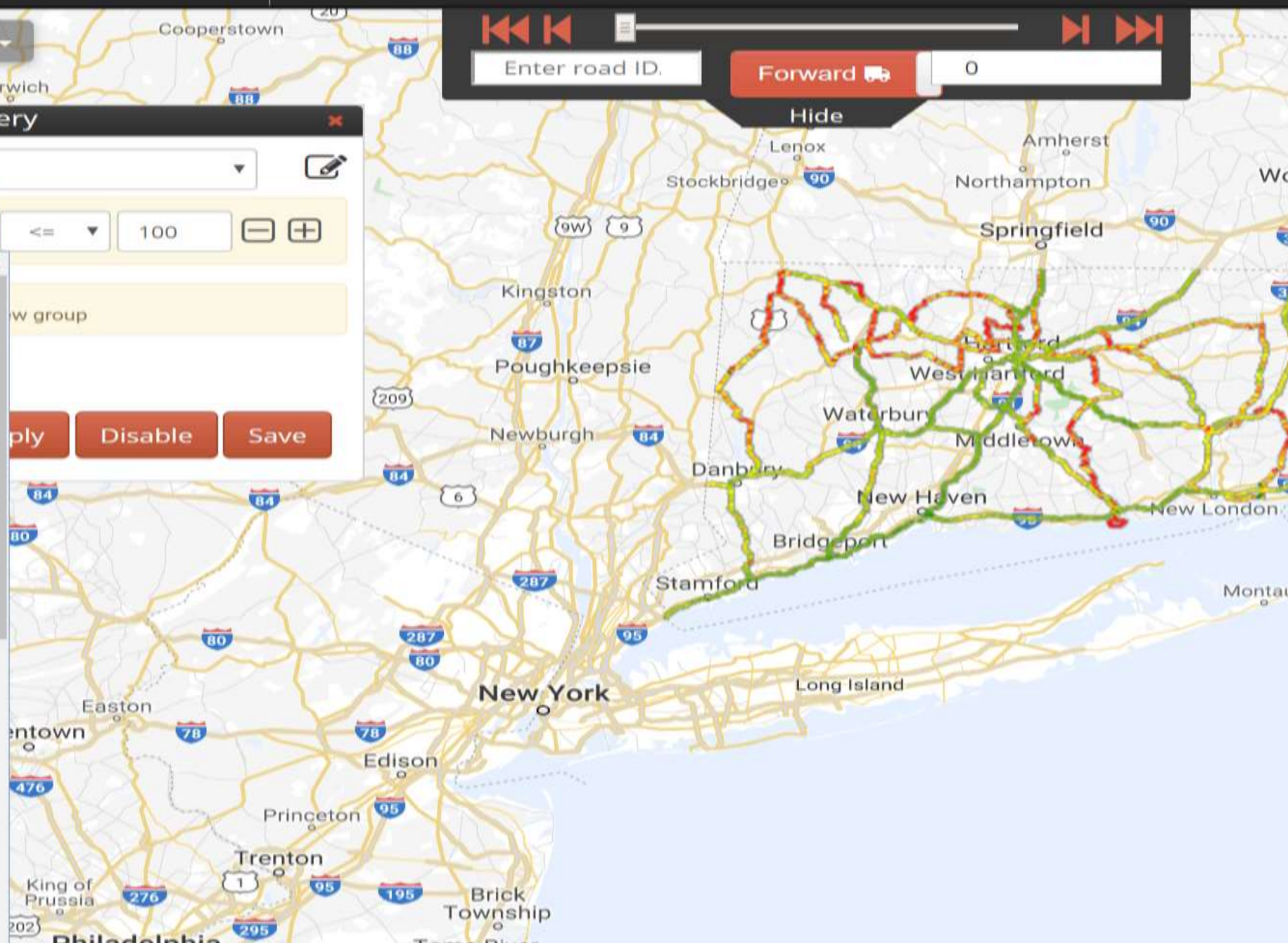
IRI Lane

Texture

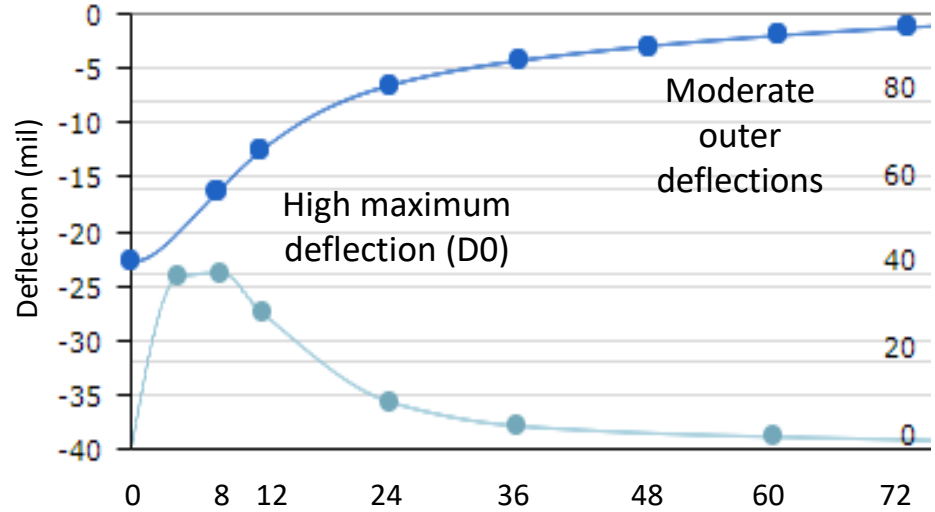
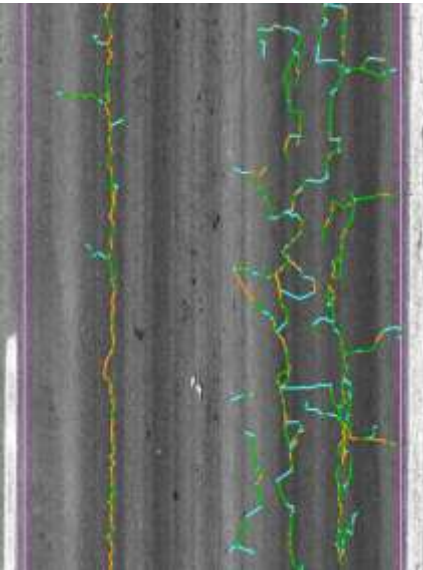
MPD Left

Vertical toolbar with icons for home, search, and other navigation functions.

Feedback

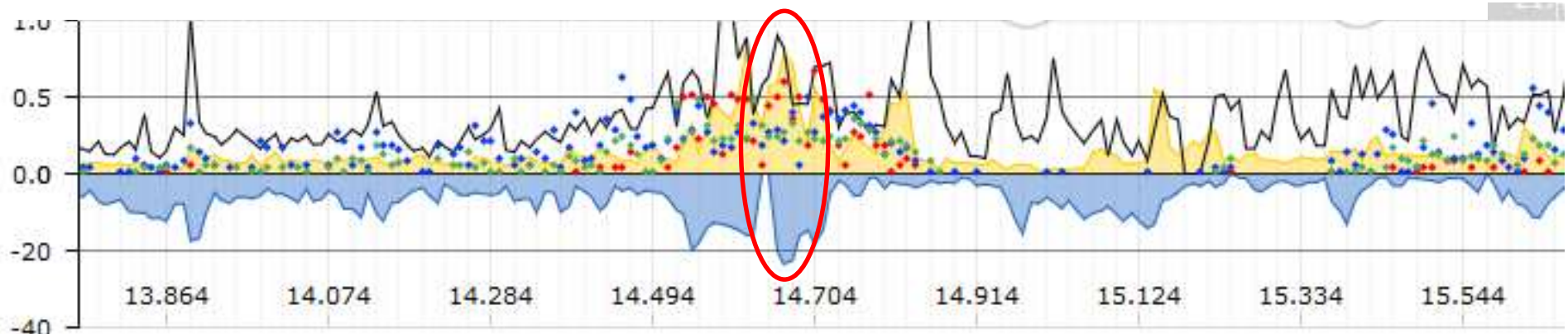


Structurally Deficient+ (Case 1)



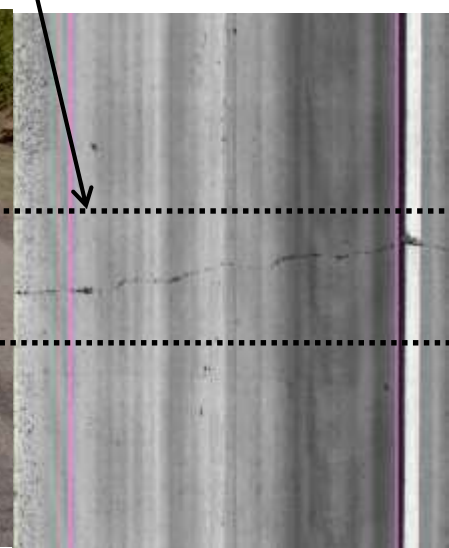
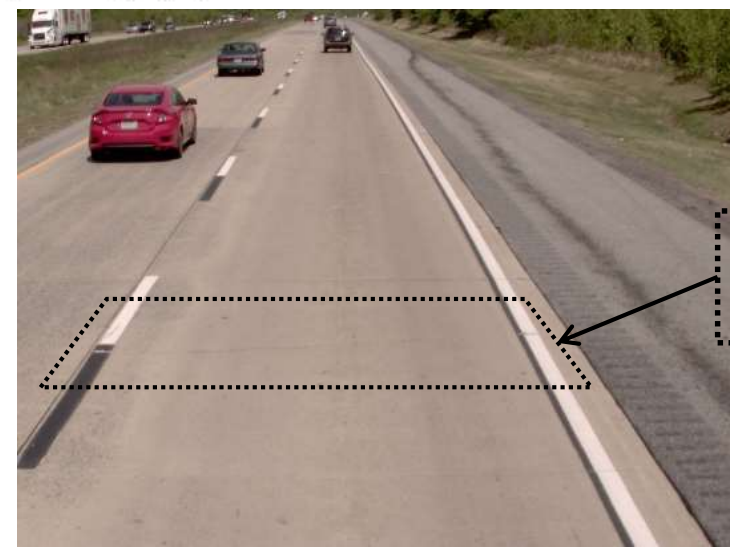
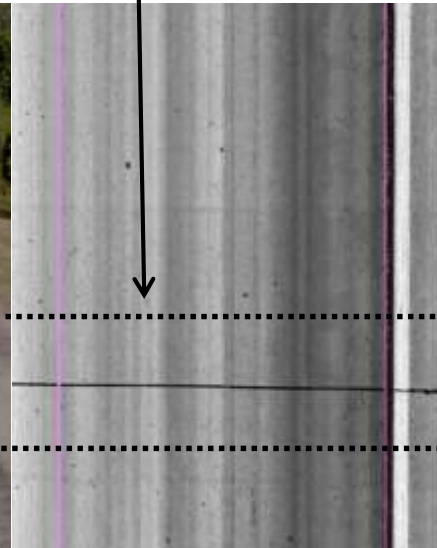
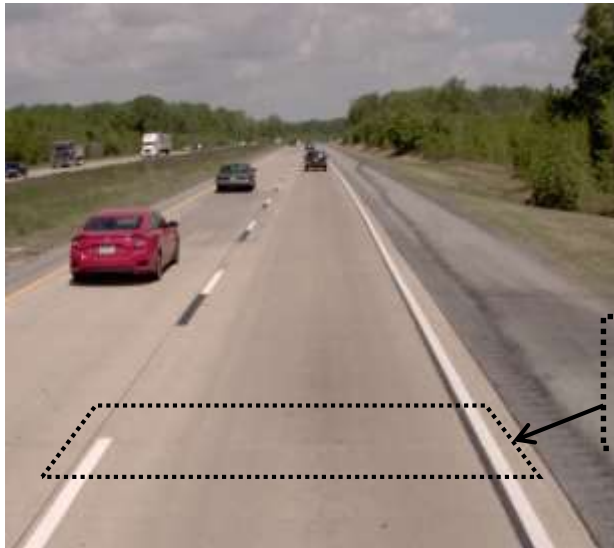
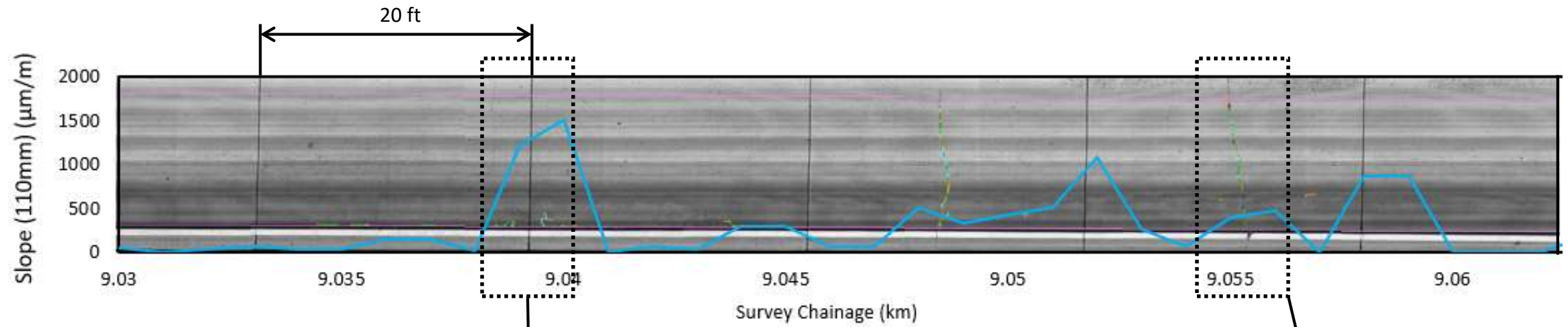
Significant visible cracking

- Maximum Deflection (D0) (mils)
- IRI Right (in/mi)
- Rut Depth Right (in)
- Total Cells Alligator Cracked (%)
- Total Cells Longitudinal Cracked (%)
- Total Cells Transverse Cracked (%)



- Filters:**
- IRI > 120
 - Rutting > 0.3 in
 - WP Cracking > 50%
 - D0 > 21 mils

Case #2 – Structurally Deficient, but?



Maximum Deflection (D0)

Old US Hwy 24

Old US Hwy 24

0070W - Inter **Reverse** 23.074

Hide

Map Satellite

Create Advanced Filter Query

Select Filter Primary Routes - Smooth Surface / Lt

- IRI Average <= 120
- Rut Depth Right <= 0.33
- Maximum Deflection (D0) >= -5

or

Add new group

Filter Query Description

= (IRI Average <= 120 AND Rut Depth Right <= 0.33 AND Maximum Deflection (D0) >= -5)

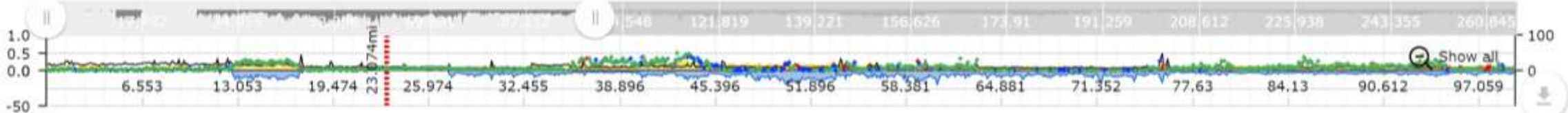
Apply Disable Save

Case #2 – Structurally Deficient, but?

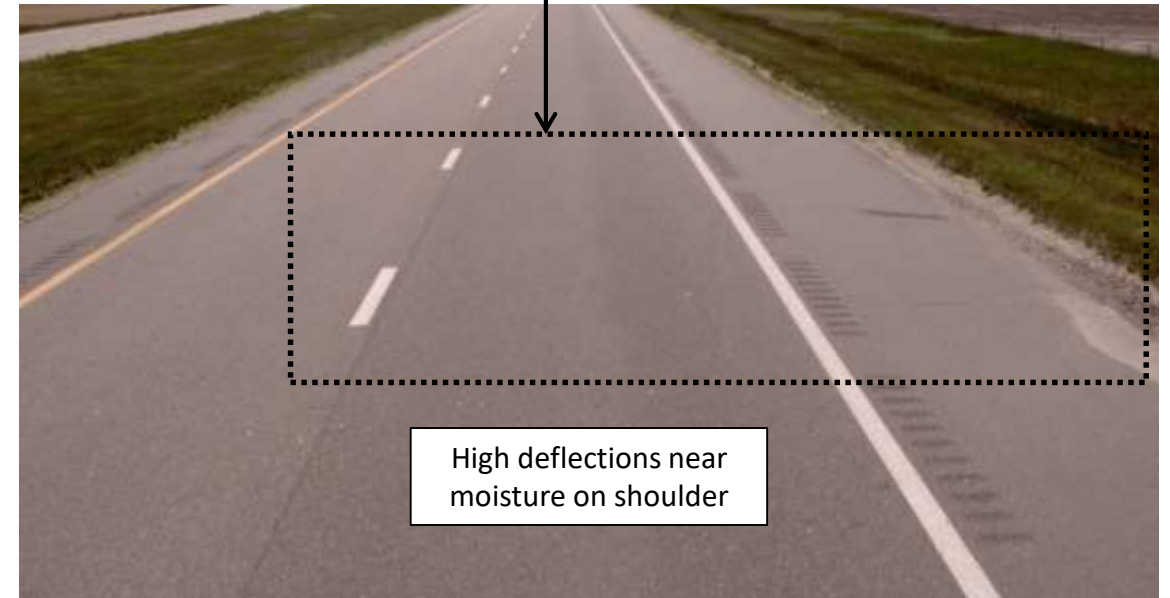
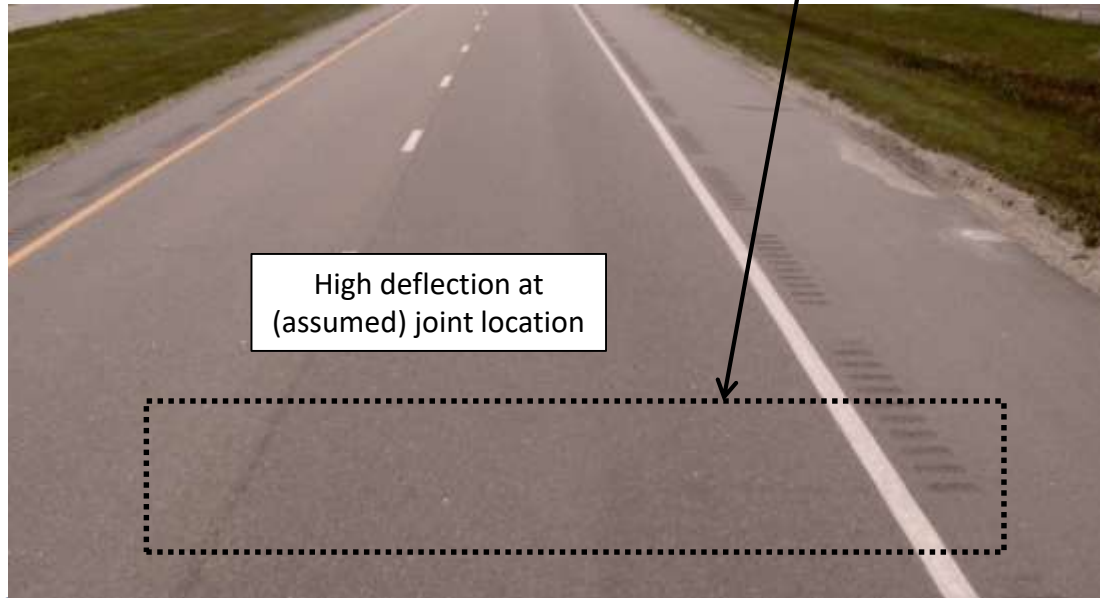
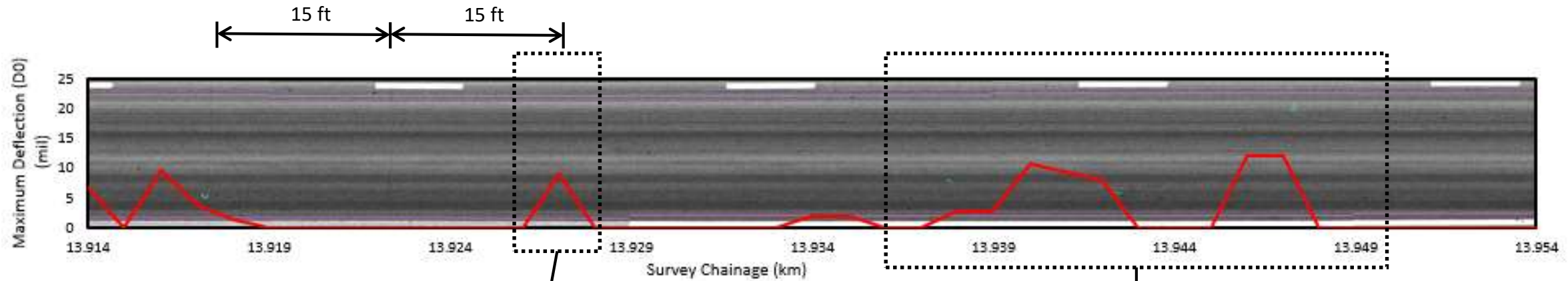


Road ID 0070W Reverse - Interstate 70 Westbound

IPAVe Select Comparison Data



Case #2A – Structurally Deficient, but?



Structurally Deficient But...? (Case 2)

- Availability of Continuous Structural Capacity:
 - Facilitates detection of structural deficiencies,
 - In spite of Good Surface Condition.
- Enables Agencies to be more proactive:
 - Plan for future,
 - Rather than reacting to deterioration.

Maximum Deflection (D0) -

CT-8 - CT Rou Reverse 2.781
Hide

Map Satellite

Create Advanced Filter Query

Select Filter: Primary Routes - Smooth Surface / Lt

Filter 1: [] <= 120

Filter 2: [] <= 0.33

Filter 3: [] >= -5

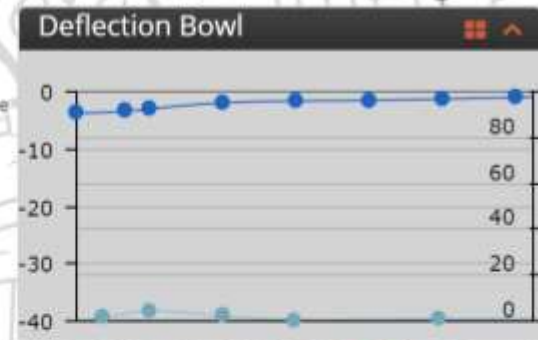
or

+ Add new group

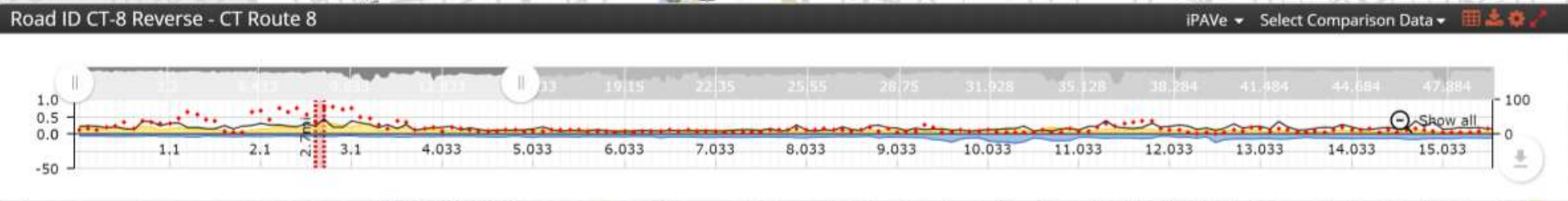
Filter Query Description
= (unknown <= 120 AND unknown <= 0.33 AND unknown >= -5)

Apply Disable Save

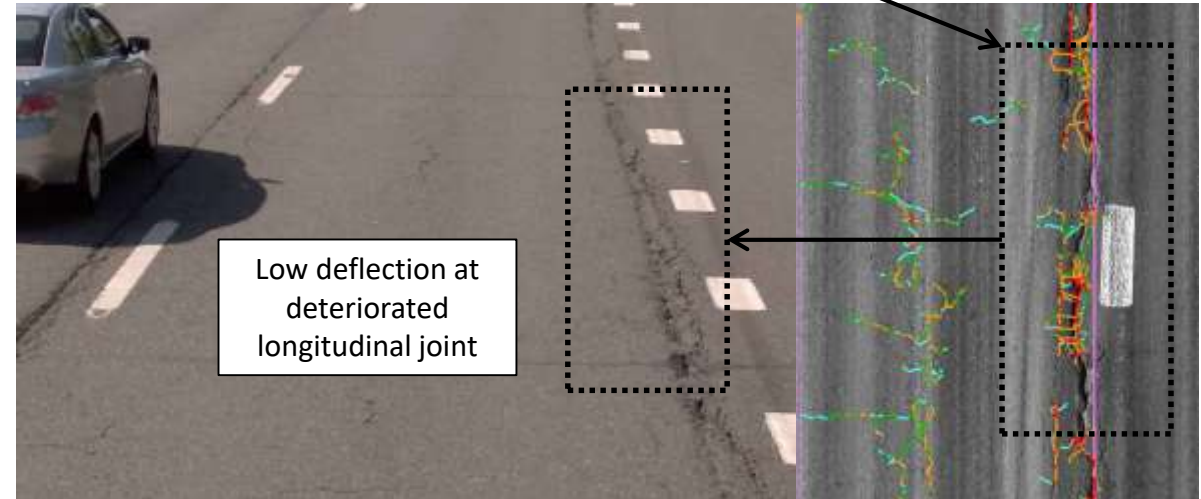
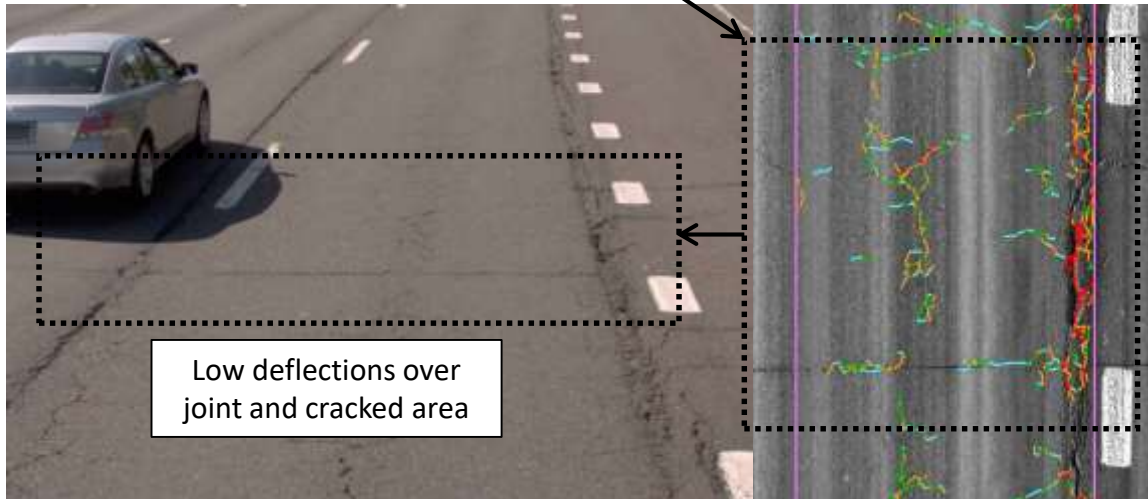
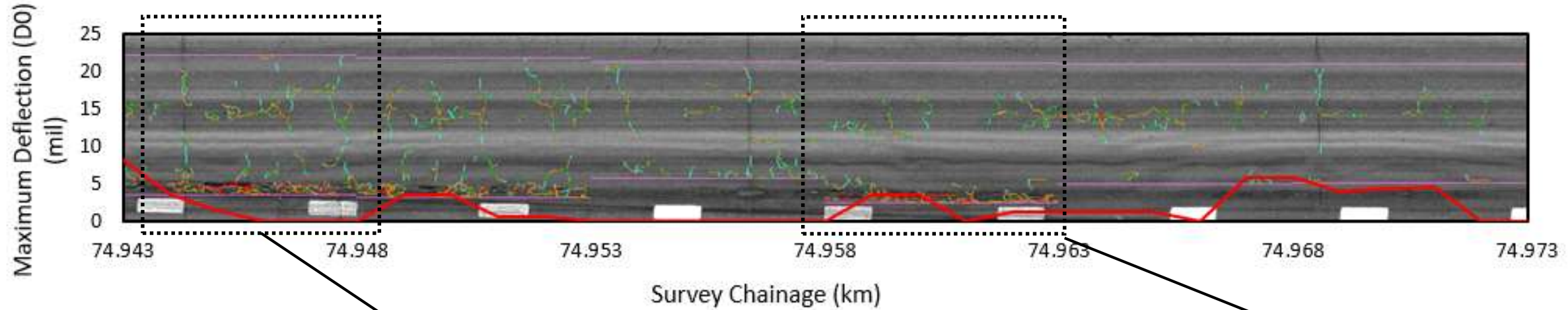
Camera not in use



Structurally Adequate, But? (Case 3)



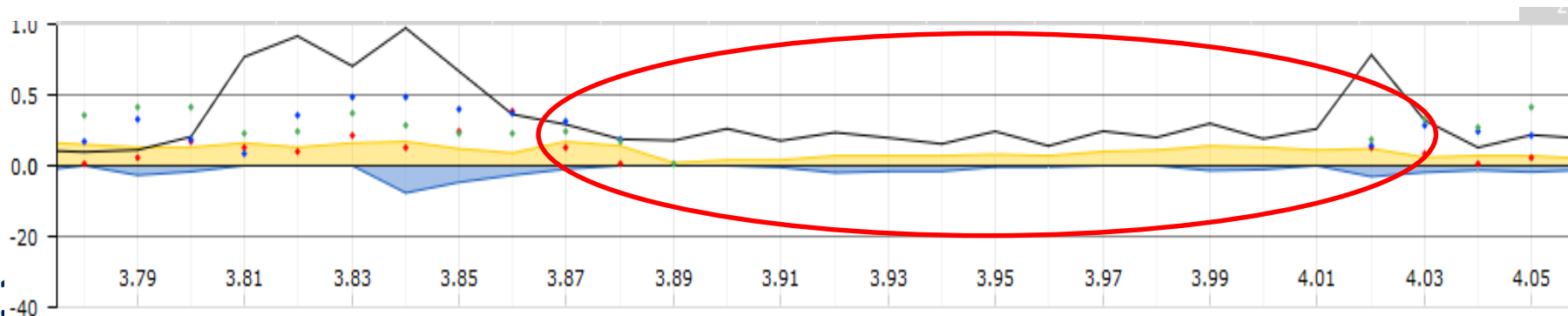
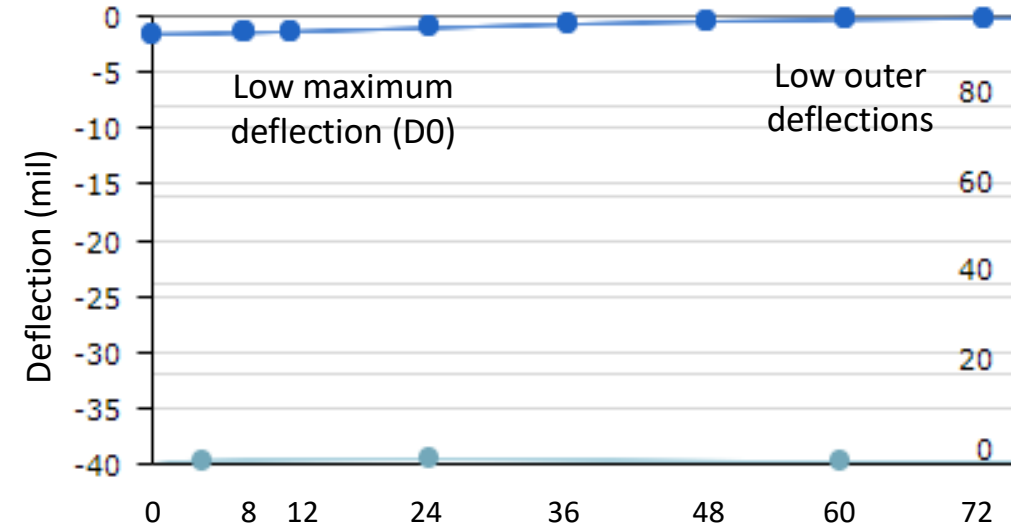
Structurally Adequate, But? (Case 3)



All Good (Case 4 ...Celebration 😊)



No visible cracking



Filters:

- IRI < 120
- Rutting < 0.3 in
- WP Cracking < 25%
- D0 < 6 mils

Net Result

Collecting Continuous Structural Capacity Data,
as part of an overall assessment provides:

- Better understanding of overall pavement condition
- Less traffic disruption
- Opportunity for better project and treatment selection
- More Cost Effective

Comprehensive Assessment Opportunities

Network Level Evaluations:

Which roads require treatment.

What treatments should be planned.

More Comprehensive Assessment of Network.

Project Level Evaluations

Localized areas requiring unique treatment.

Additional Structure Needed.

Questions

- ? Is load transfer efficiency still the best metric for evaluating JCP structural capacity?
- ? What metric(s) are needed?
- ? What are the perceived limitations and/or potential approaches for mitigation?
- ? What additional applications merit consideration?

Jerry.Daleiden@arrbgroup.net

