9th International Conference on MANAGING PAVEMENT ASSETS (ICMPA9)

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ICMPA9 • International Conference on Managing Pavement Assets

LTPP InfoPave™

Extracting Information out of LTPP Data

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AASHTO The Voice of Transportation

VirginiaTech Transportation Institute

TRB

U.S. Department of Transportation Federal Highway Administration

World Road Association Mondiale de la Route 1909-2009

VDOT Virginia Department of Transportation

iENGINEERING The Information Engineering Company

FUGRO

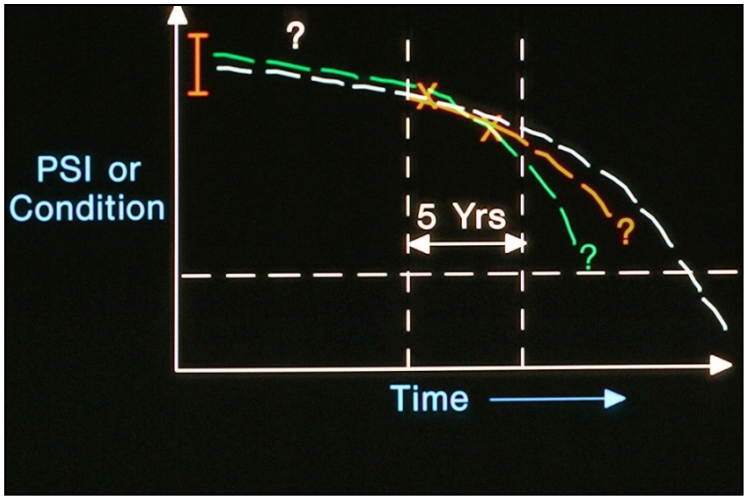
LTPP

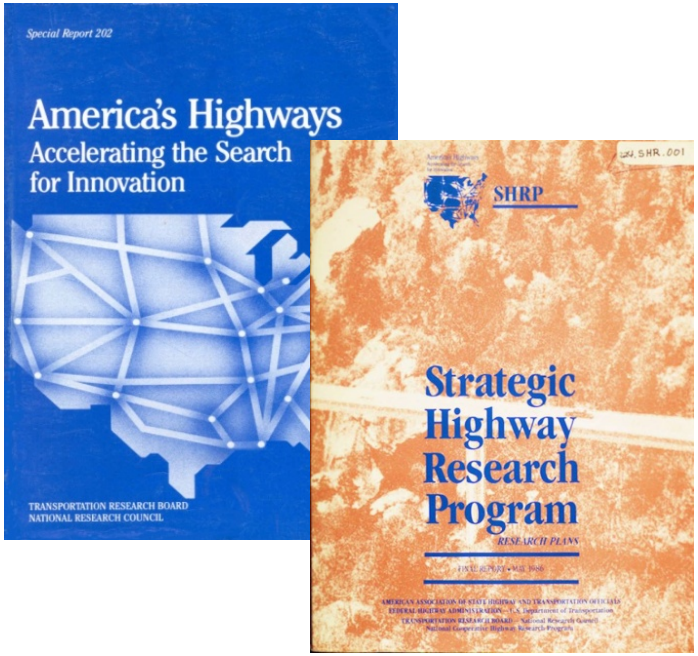
U.S. Department of Transportation Federal Highway Administration

Overview

1) Introduction to LTPP
2) Data visualization in LTPP InfoPave
3) Extracting information out of the data
4) Discussion

LTPP'S GOAL IS…





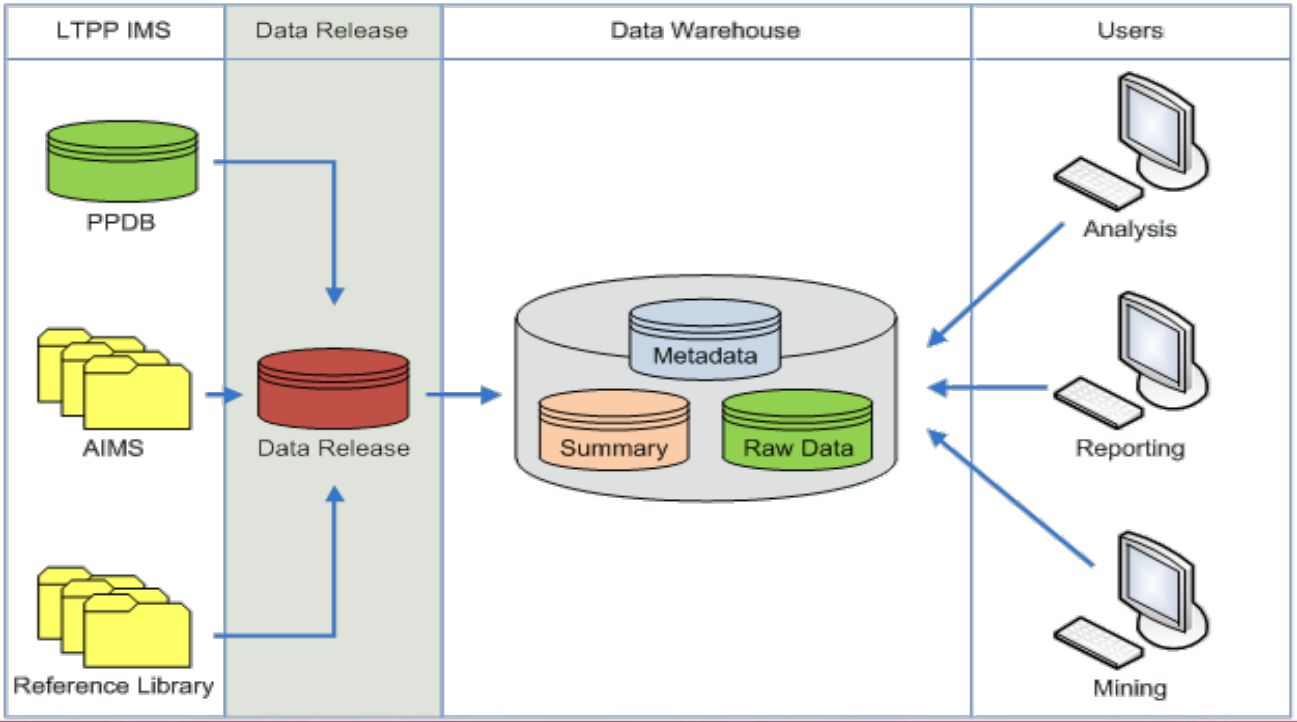
to provide answers to

HOW and ***WHY***

pavements perform as they do!

LTPP InfoPave

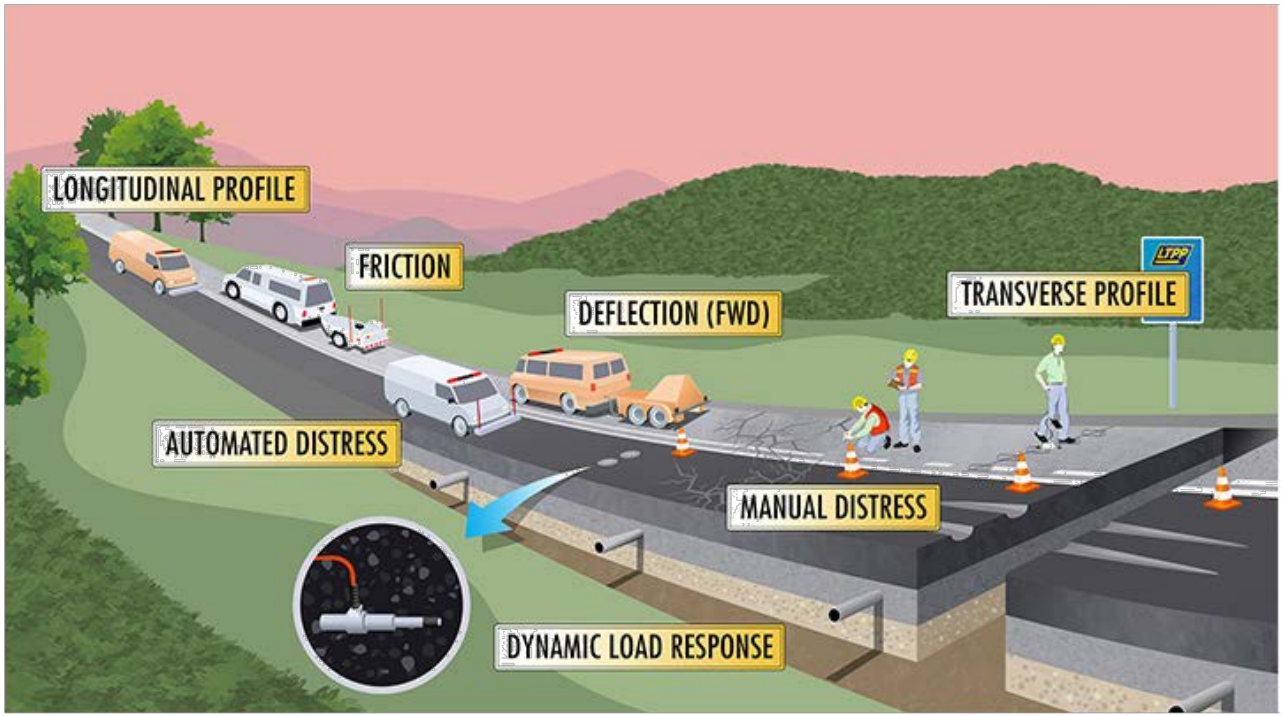
- Enhance Access and Understanding
- Improve Utilization
- Disseminate Information



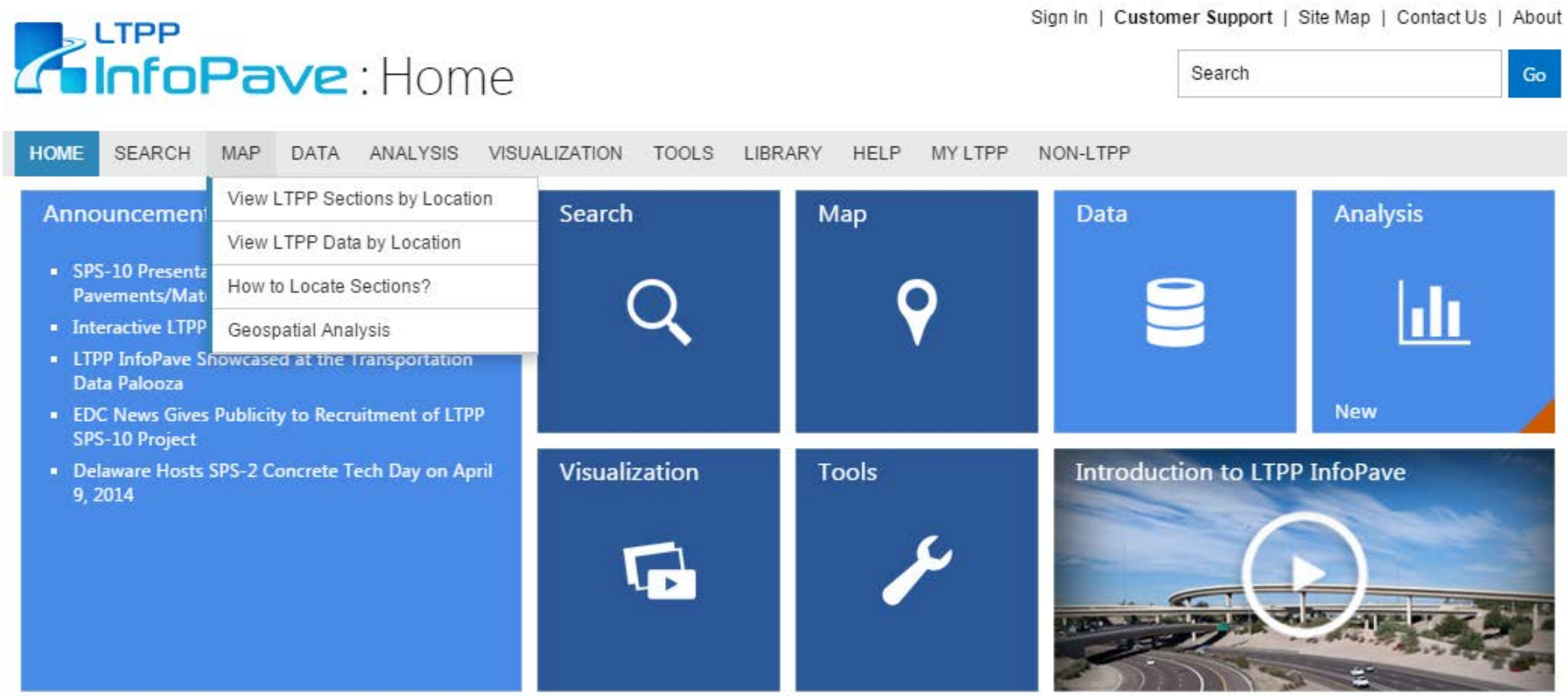
LTPP DATA VISUALIZATION

LTPP InfoPave

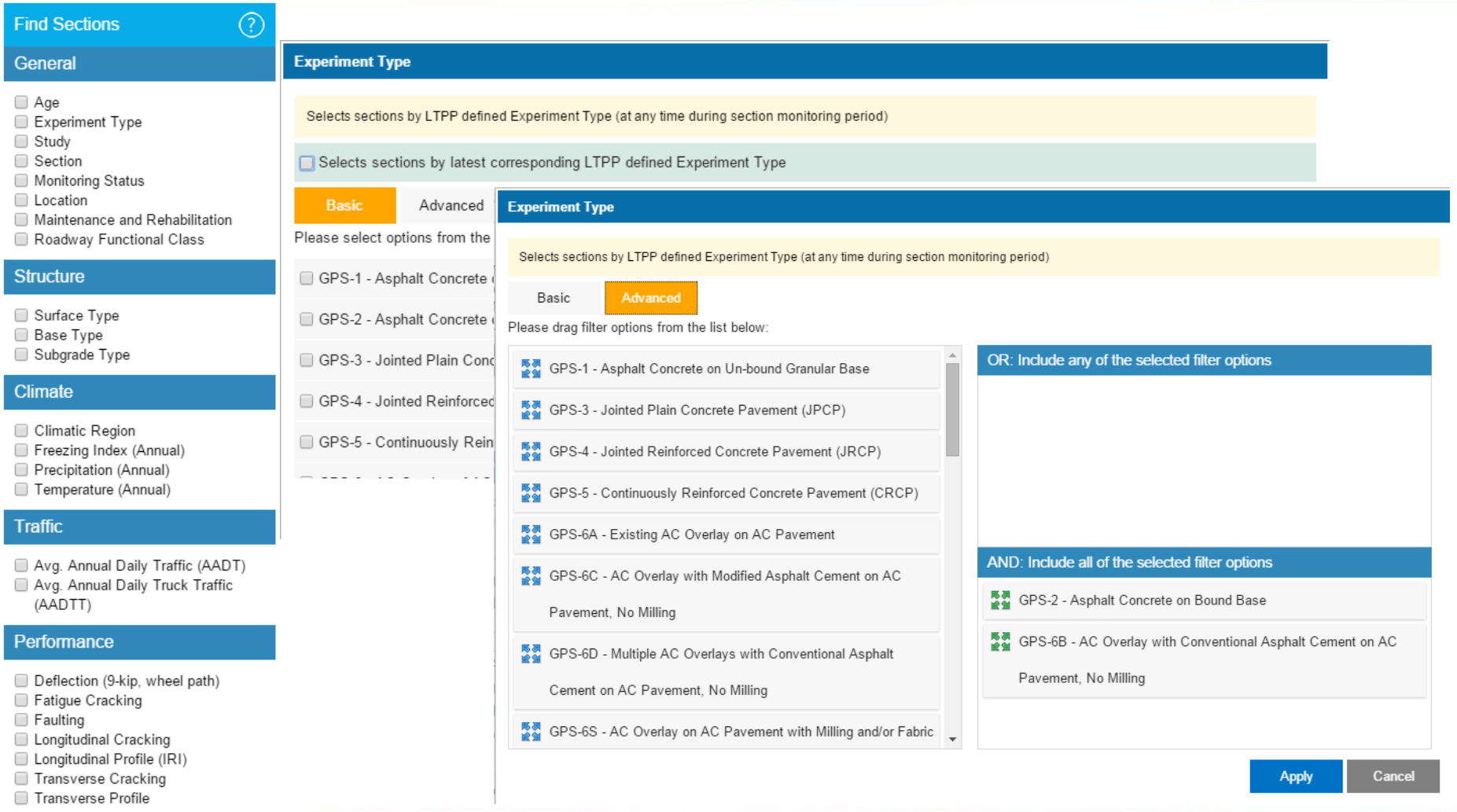
Structure | Climate | Traffic | Performance



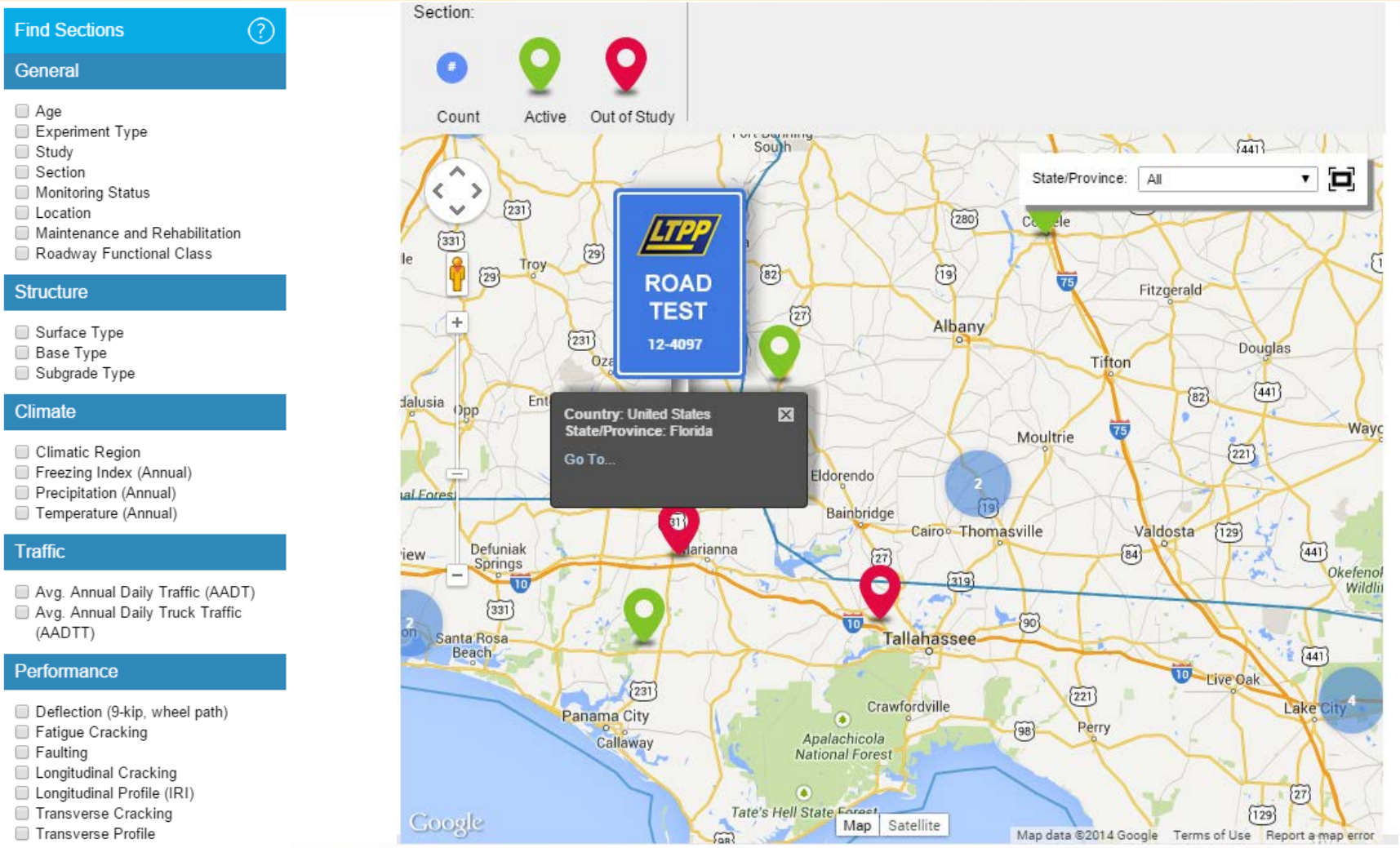
Home: Getting Started



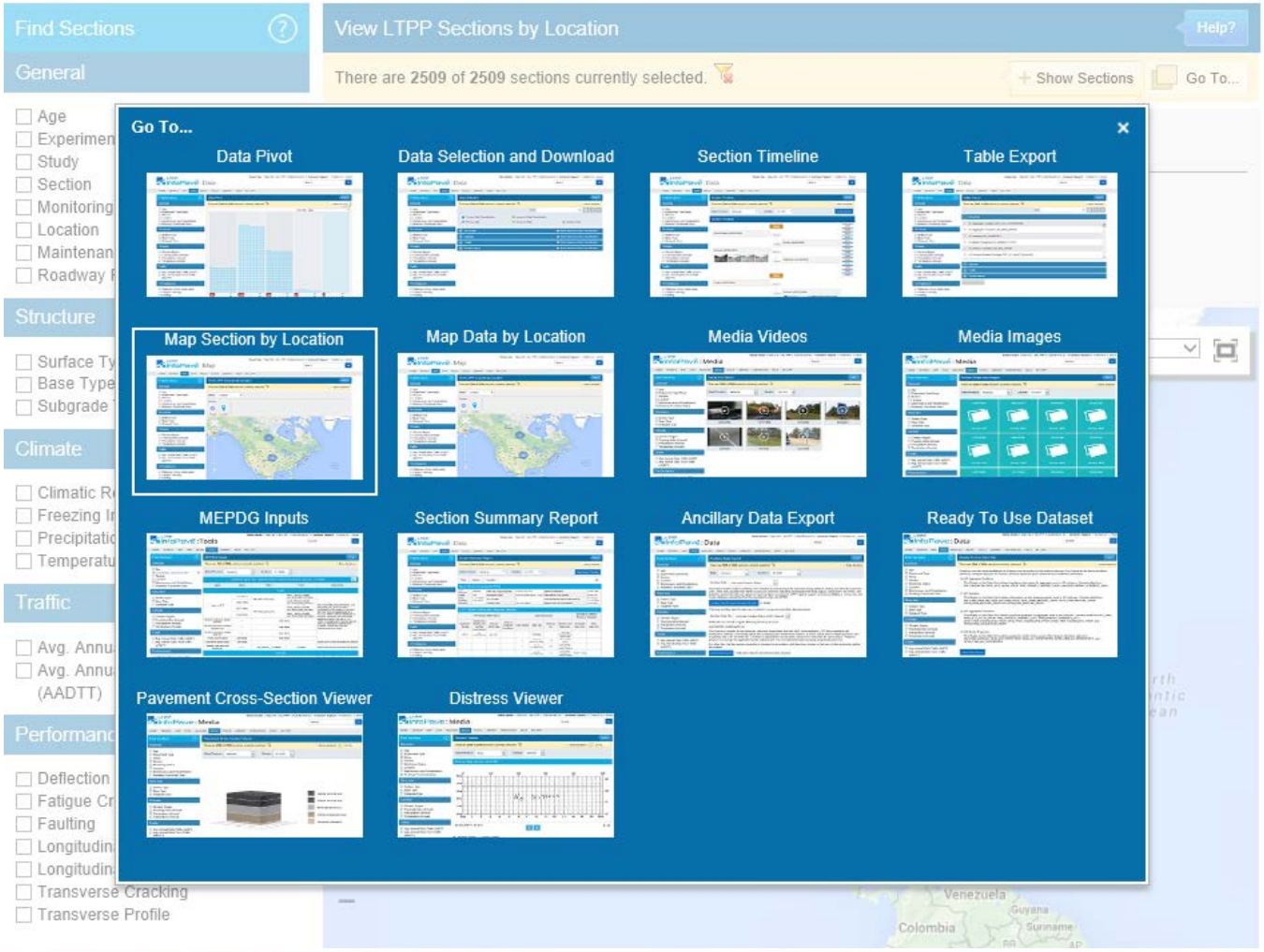
Find Sections: Advanced Filters



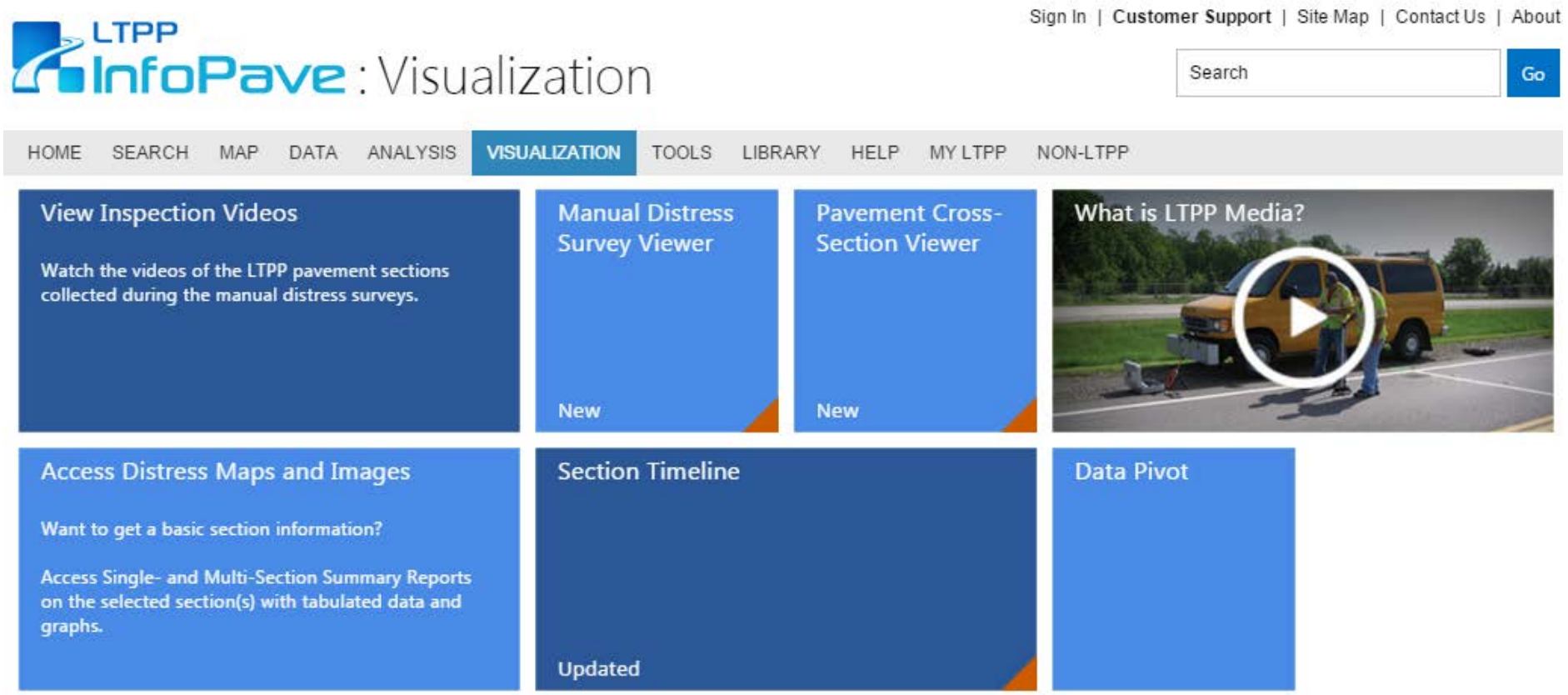
Map: Locate Sections



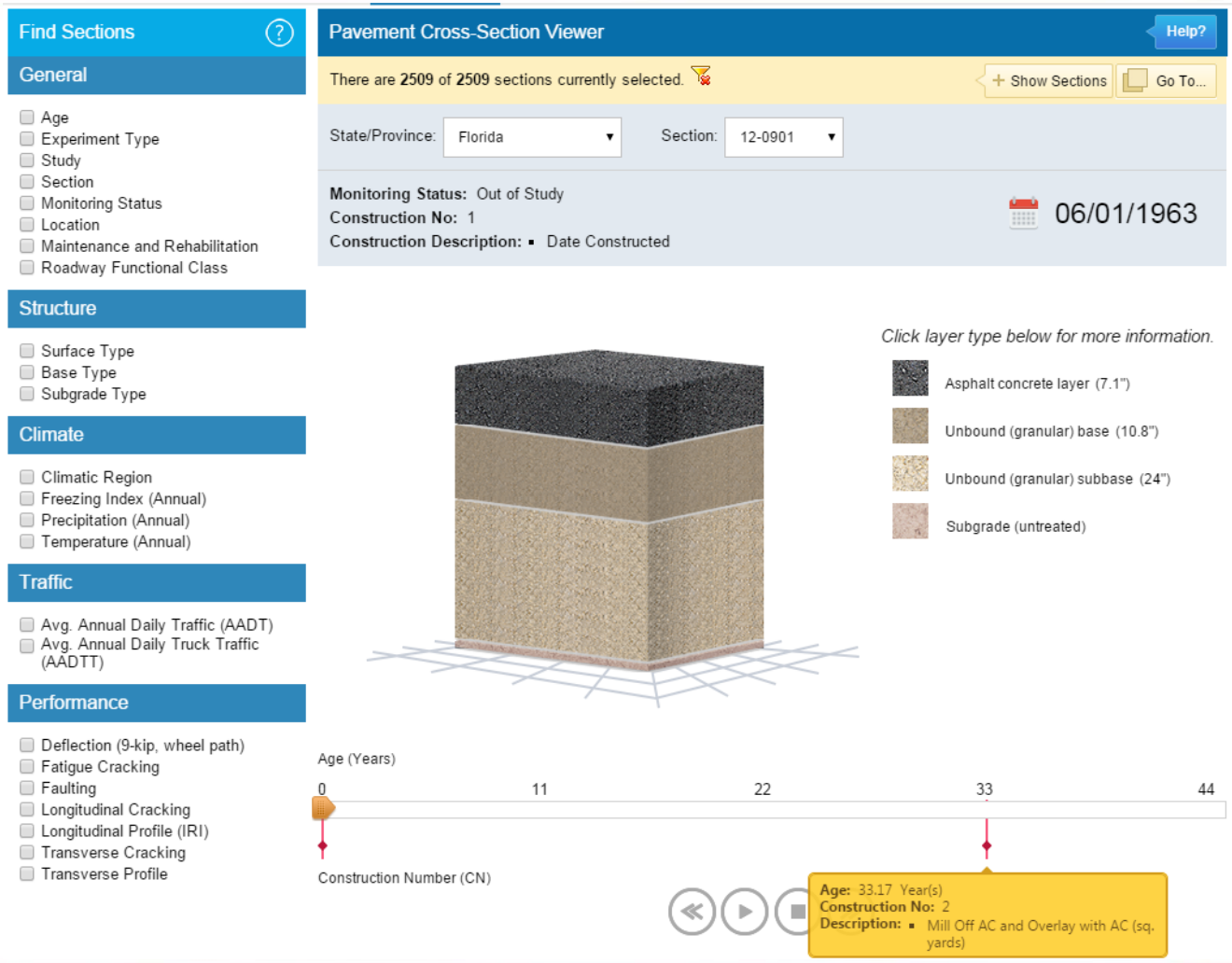
Toggle (Go To...)


Find Sections
General
Age
Experimen
Study
Section
Monitoring
Location
Maintenan
Roadway
Structure
Surface Ty
Base Type
Subgrade
Climate
Climatic R
Freezing I
Precipitatio
Temperatu
Traffic
Avg. Annu
Avg. Annu
(AADTT)
Performanc
Deflection
Fatigue Cr
Faulting
Longitudin
Longitudin
Transverse Cracking
Transverse Profile
View LTPP Sections by Location
Help?
There are 2509 of 2509 sections currently selected.
Show Sections
Go To...
Go To...
Data Pivot
Data Selection and Download
Section Timeline
Table Export
Map Section by Location
Map Data by Location
Media Videos
Media Images
MEPDG Inputs
Section Summary Report
Ancillary Data Export
Ready To Use Dataset
Pavement Cross-Section Viewer
Distress Viewer
Venezuela
Guyana
Colombia
Suriname

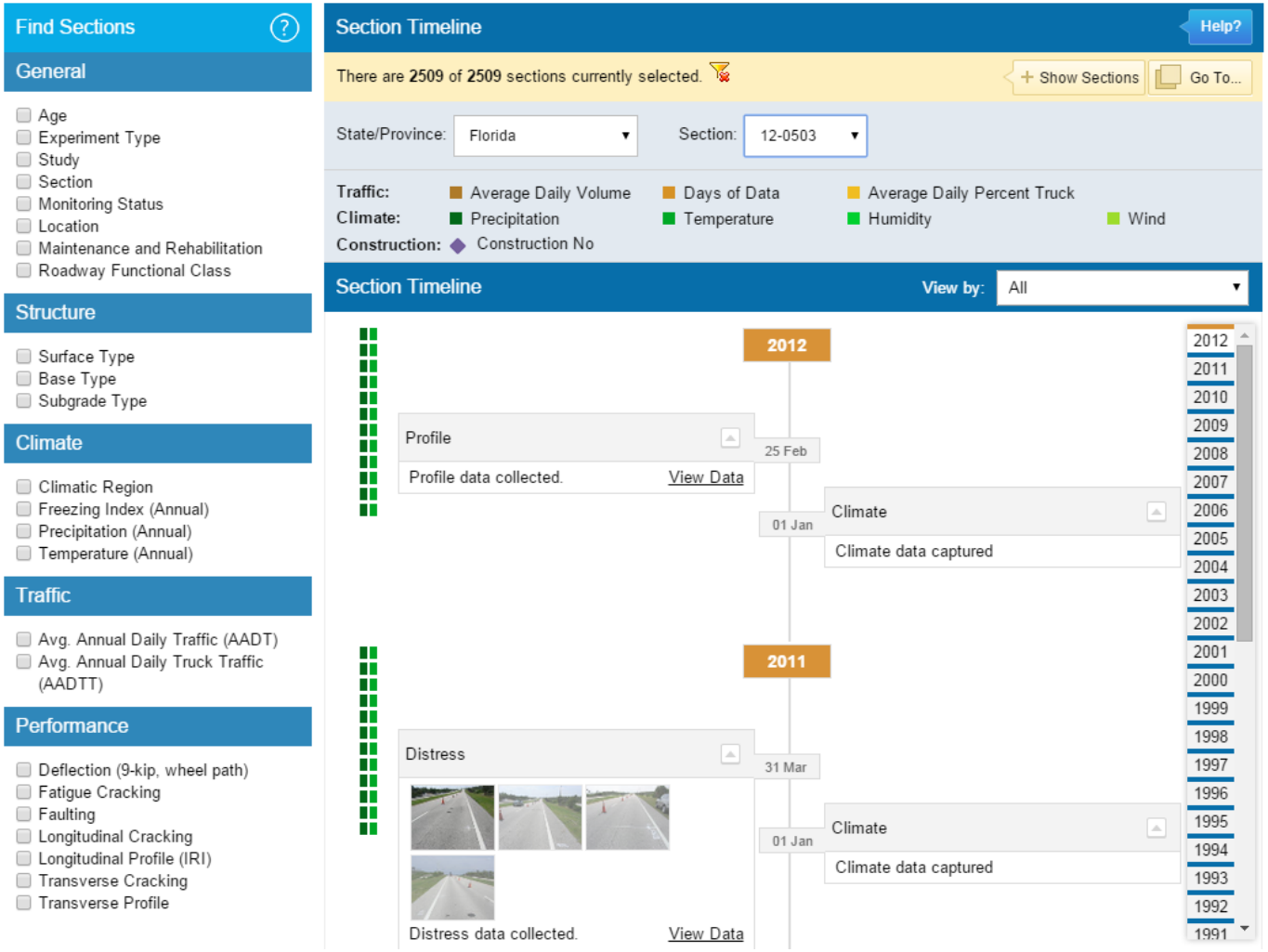
LTPP Data Visualization



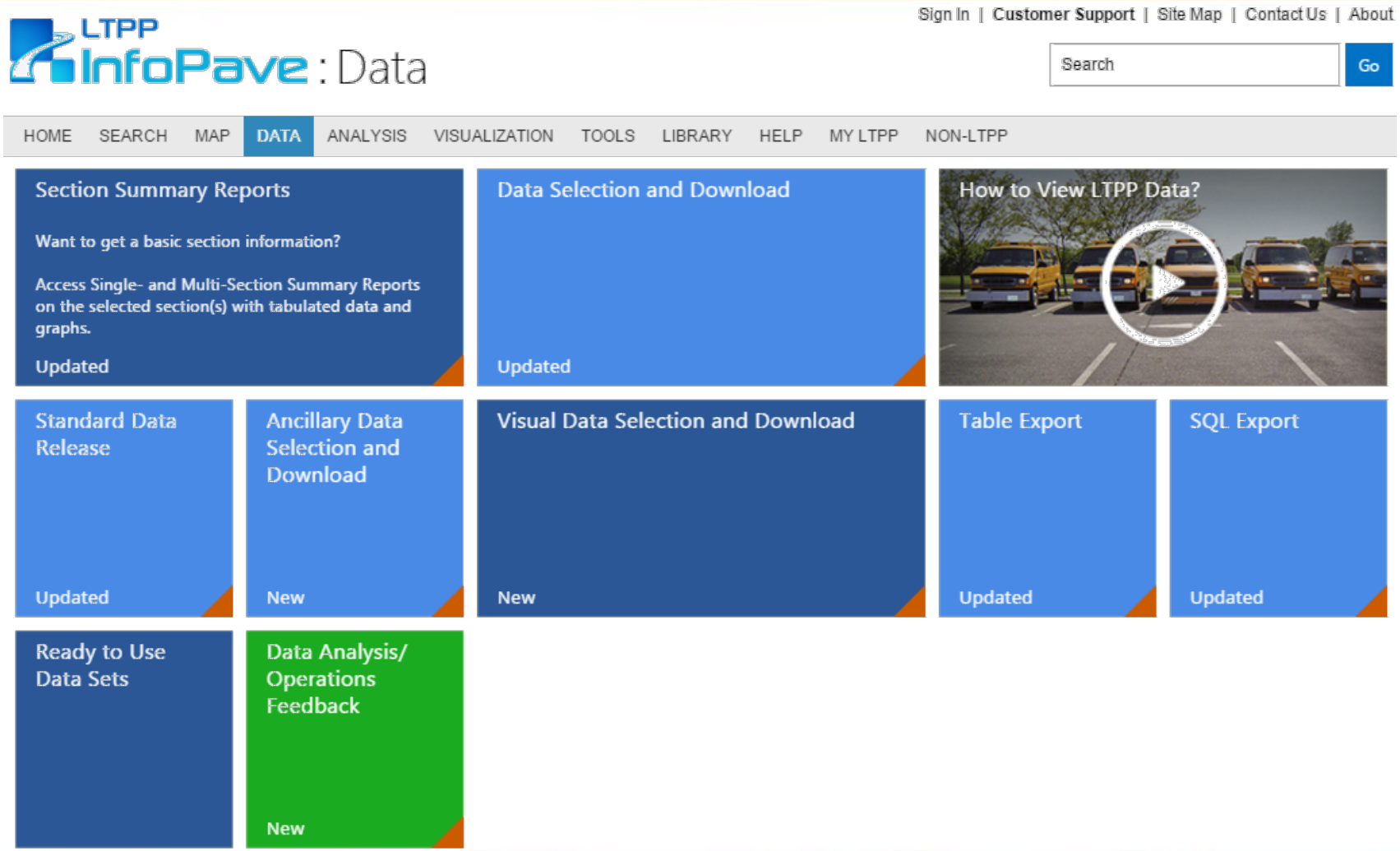
Pavement Cross-Section Viewer



Section Timeline



Access LTPP Data

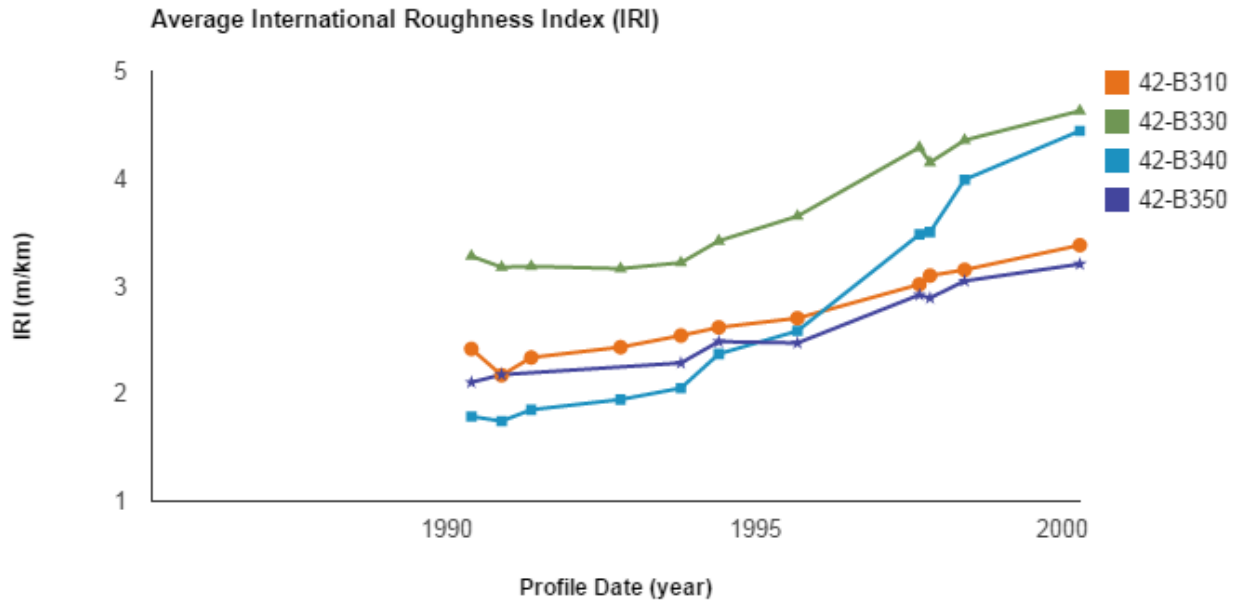


Section Summary Report

Data | Graphs

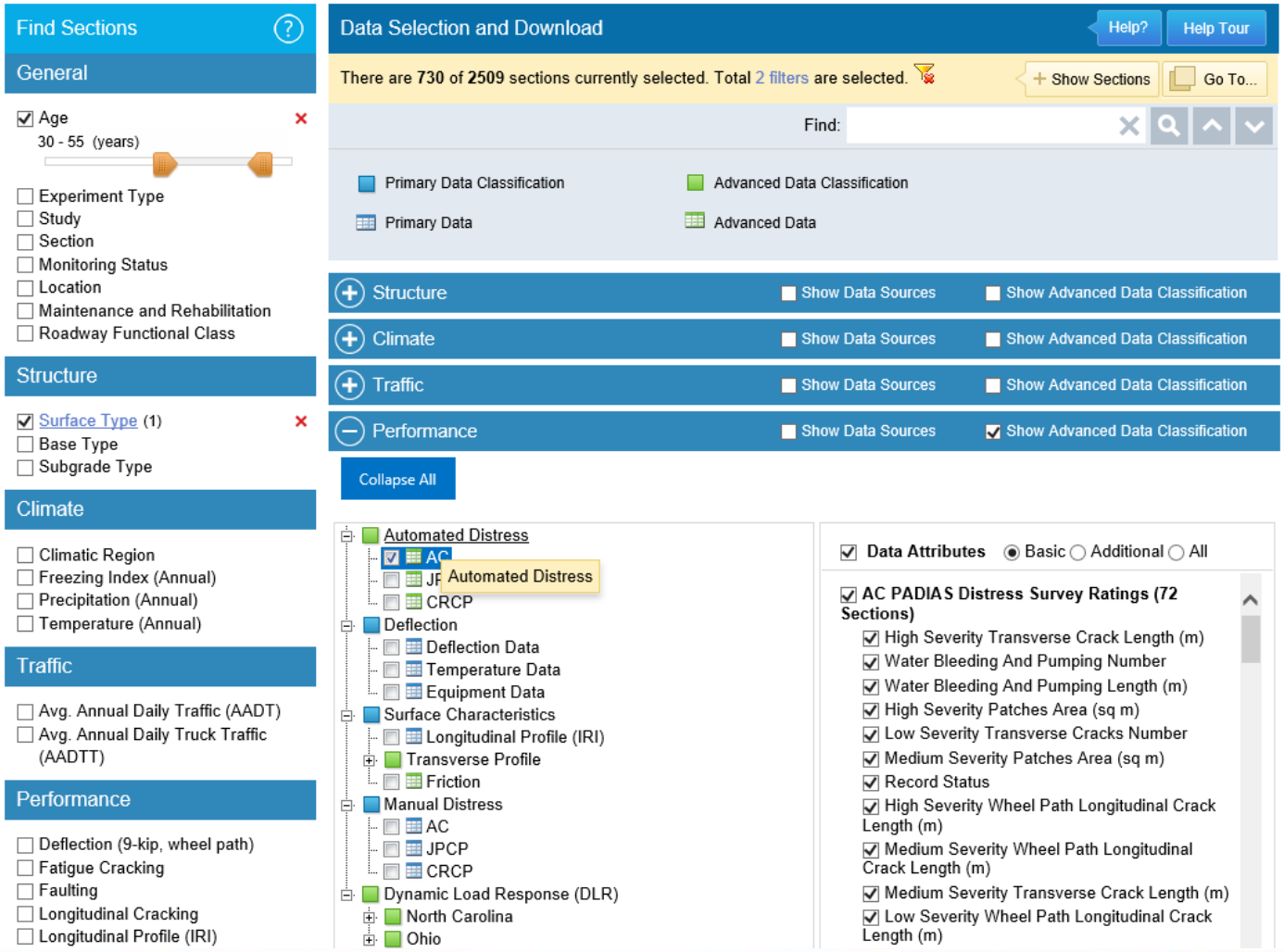
⊕ Average Annual Freezing Index

⊖ Average International Roughness Index (IRI)

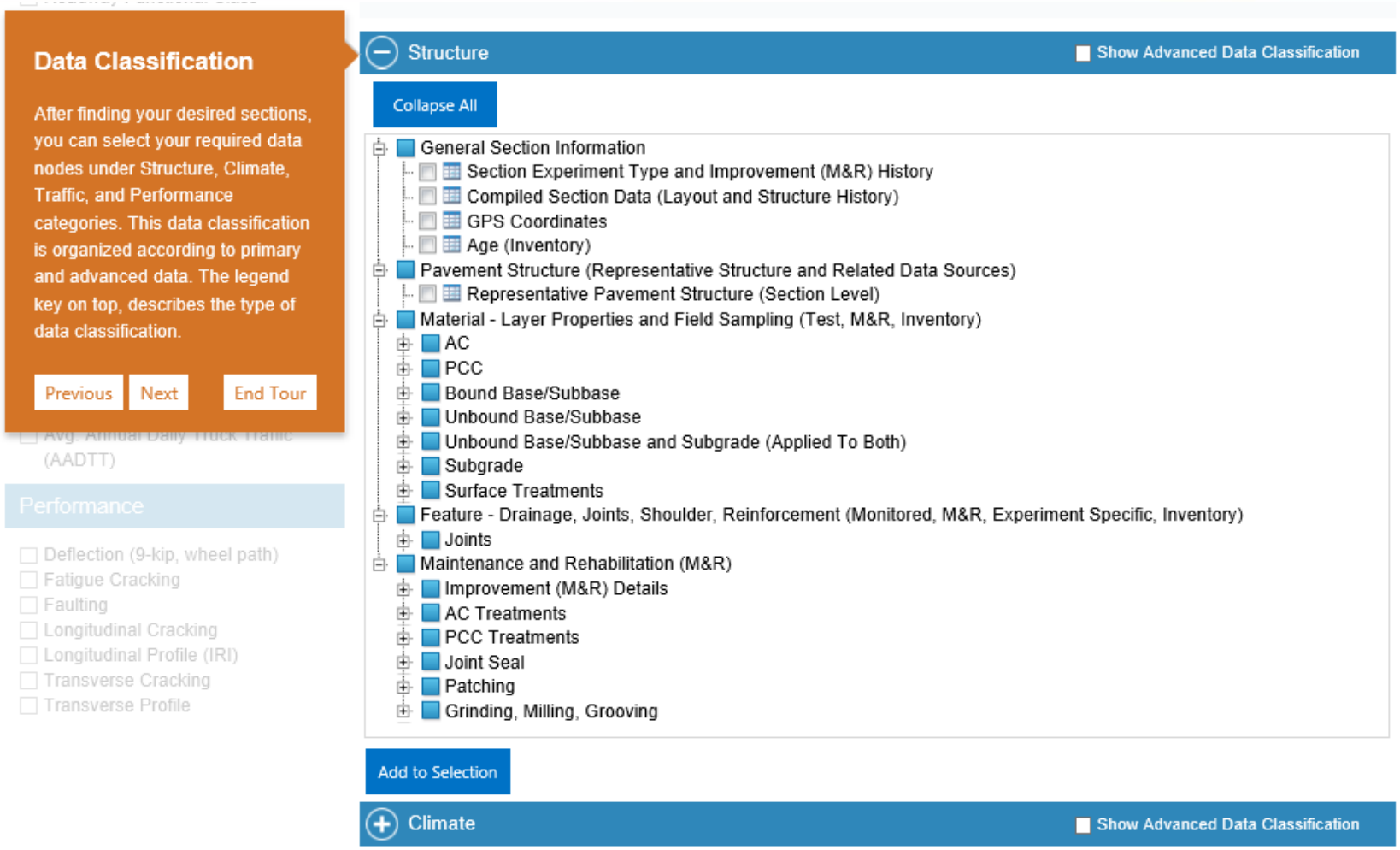


⊕ Total Area of AC Fatigue Cracking

Data Selection and Download



Interactive Help (Guided Tour)



APPLICATION SAMPLES

- *Sample Application 1:* IRI trends following various rehabilitation treatments on AC
- *Sample Application 2:* Cracking trends on JPCP pavements with various structural properties
- *Sample Application 3:* Comparison of AC pavement profiles following various maintenance treatments
- *Sample Application 4:* Evaluation of pavement structural condition using available FWD deflection data

www.InfoPave.com: Help → Application Samples

Problem Statement #1

Objective: Investigate effects of rehabilitation treatments on flexible pavement performance using International Roughness Index (IRI) data

Approach: compare IRI trends on various sections of one SPS-5 site

Selection Criteria:

- SPS-5 experiment
- AADTT < 1000 trucks/day
- Wet-no freeze climatic zone

Downloaded Data

	A	B	C	D	E	F	J	K	L
1	STATE_CODE	SHRP_ID	CONSTRUCTION_NO	PROFILE_DATE	PROFILE_TIME	RUN_NUMBER	IRI_LEFT_WHEEL_PATH	IRI_RIGHT_WHEEL_PATH	IRI_AVERAGE
2	40	0509	2	Jan/14/1998	16:46:05	3	1.073	0.745	0.909
3	40	0509	2	Jan/14/1998	17:10:55	6	1.075	0.762	0.918
40	40	0503	3	Jan/04/2001	12:32:2	16	1.098	0.887	0.992
41	40	0509	3	Jan/04/2001	12:56:2	16	1.025	0.842	0.933

EXPERIMENT_SECTION | TST_L05B | TRF_MON_EST_ESAL | MON_PROFILE_MASTER | Table Reference | Field Reference | Codes Reference

Ready

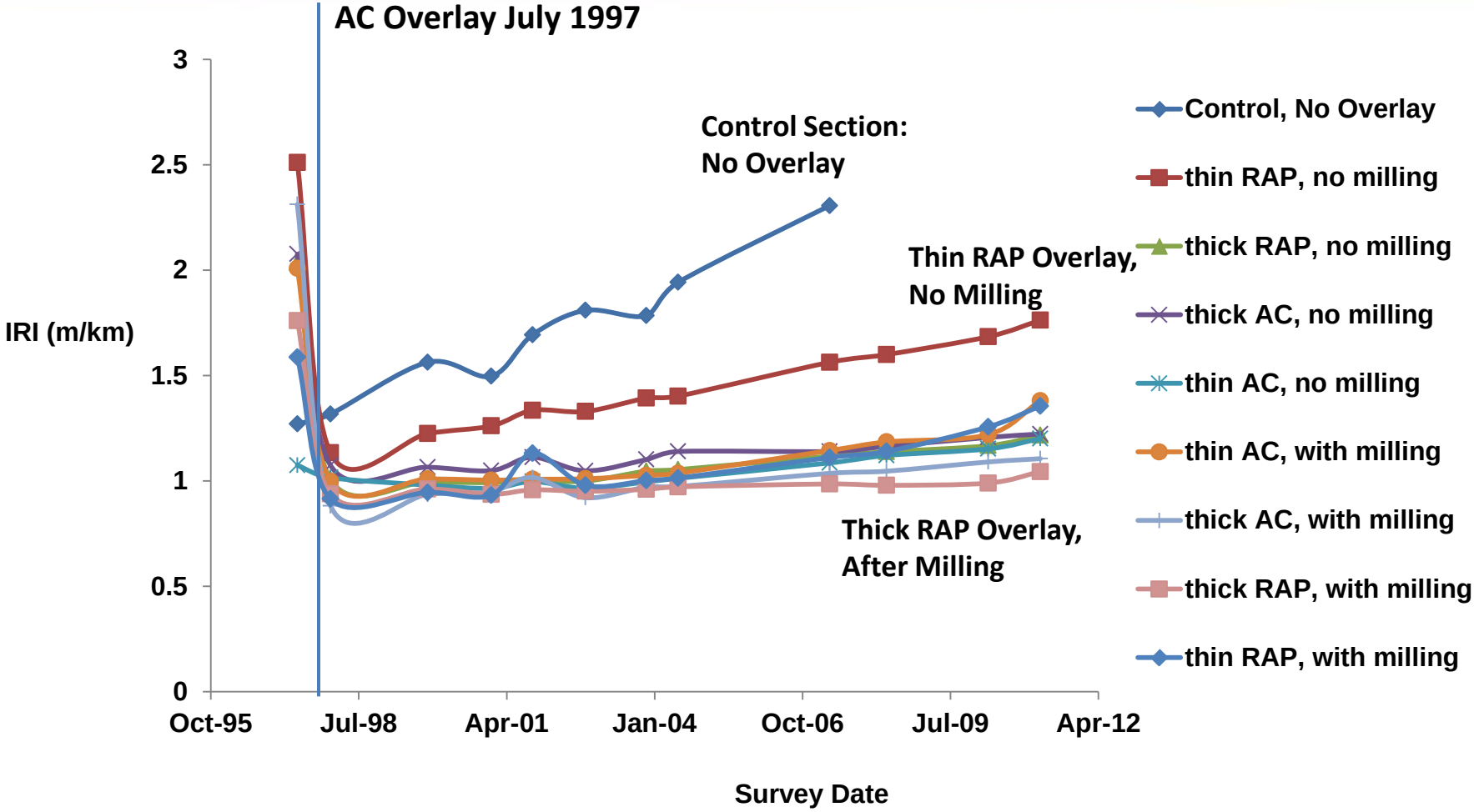
G	H	I	J	M
POINT_LOC	LANE_NO	LANE_NO_EXP	DROP_NO	DROP_HEIGHT_EXP
0	F1	Flexible pavement mid lane	1	Drop height position 1, target load 27KN (6kips) - 380kpa for standard
0	F1	Flexible pavement mid lane	2	Drop height position 1, target load 27KN (6kips) - 380kpa for standard
0	F1	Flexible pavement mid lane	3	Drop height position 1, target load 27KN (6kips) - 380kpa for standard
0	F1	Flexible pavement mid lane	4	Drop height position 1, target load 27KN (6kips) - 380kpa for standard
0	F1	Flexible pavement mid lane	13	Drop height position 4, target load 71KN (16kips) - 1000kpa for standa
0	F1	Flexible pavement mid lane	14	Drop height position 4, target load 71KN (16kips) - 1000kpa for standa
0	F1	Flexible pavement mid lane	15	Drop height position 4, target load 71KN (16kips) - 1000kpa for standa
0	F1	Flexible pavement mid lane	16	Drop height position 4, target load 71KN (16kips) - 1000kpa for standa
0	F3	Flexible pavement outer wheel path	1	Drop height position 1, target load 27KN (6kips) - 380kpa for standard
0	F3	Flexible pavement outer wheel path	2	Drop height position 1, target load 27KN (6kips) - 380kpa for standard

Rehabilitation Treatments Data

the SPS-5 site in Oklahoma

Section	Surface Preparation	Overlay Materials	Overlay Thickness
0501	Control Section	No Overlay	No Overlay
0502	None	Recycled	1.7”
0503	None	Recycled	4.5”
0504	None	Virgin	4.4”
0505	None	Virgin	1.8”
0506	Milling	Virgin	3.8”
0507	Milling	Virgin	6.3”
0508	Milling	Recycled	6.3”
0509	Milling	Recycled	3”

IRI Trends on SPS-5 in Oklahoma



Sample Application Findings

On Oklahoma SPS-5 site:

- Milling existing pavement surface resulted in more effective treatments in reducing the IRI
- Thicker overlays resulted in lower IRI increase rates
- Thin overlay with recycled asphalt pavement and without milling had the highest rate of increase in IRI
- There is no difference between the performance of overlays with recycled and virgin asphalt materials

Problem Statement #2

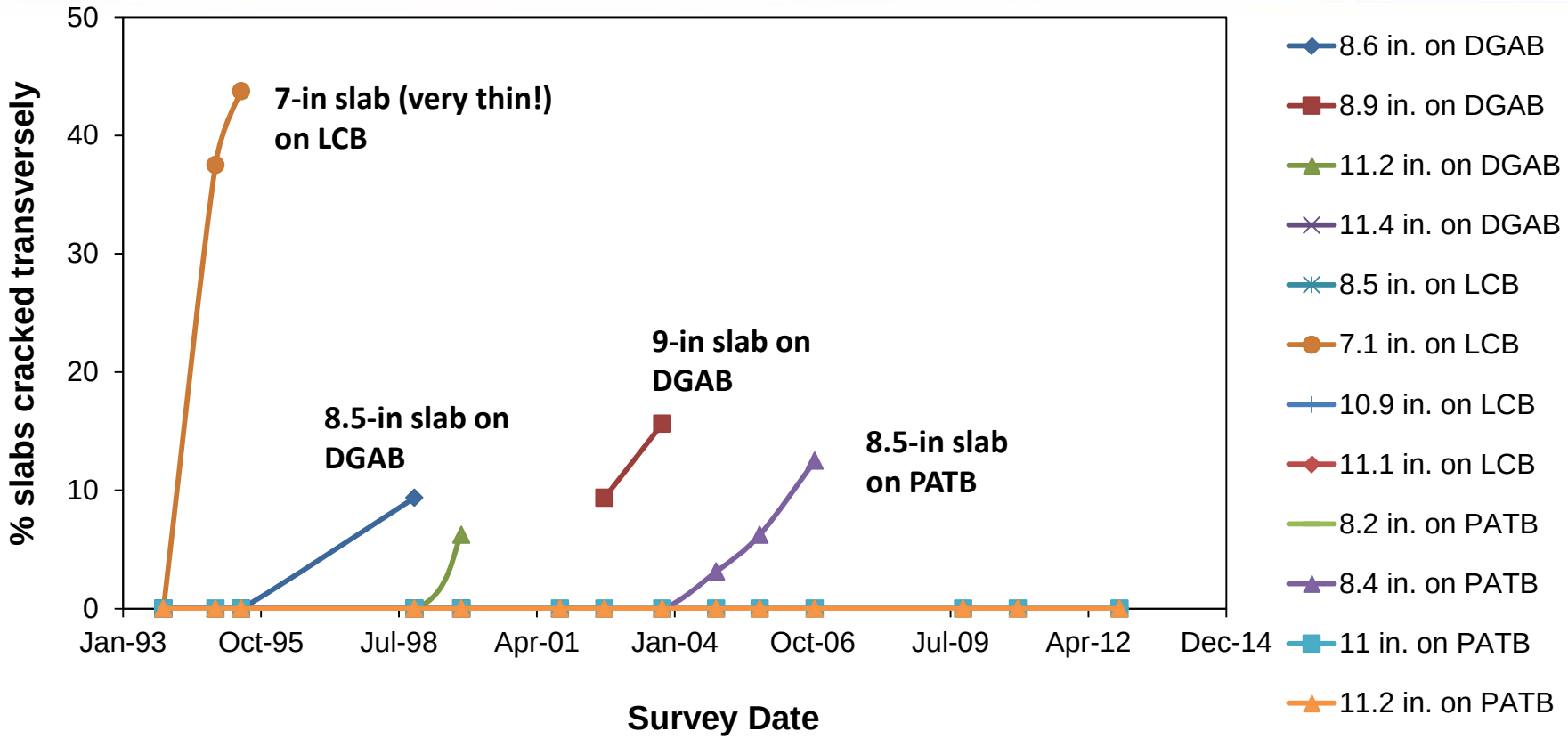
Objective: Investigate effects of structural factors on performance of jointed concrete pavements

Approach: compare cracking, faulting and IRI trends on various sections of one SPS-2 site

Selection Criteria:

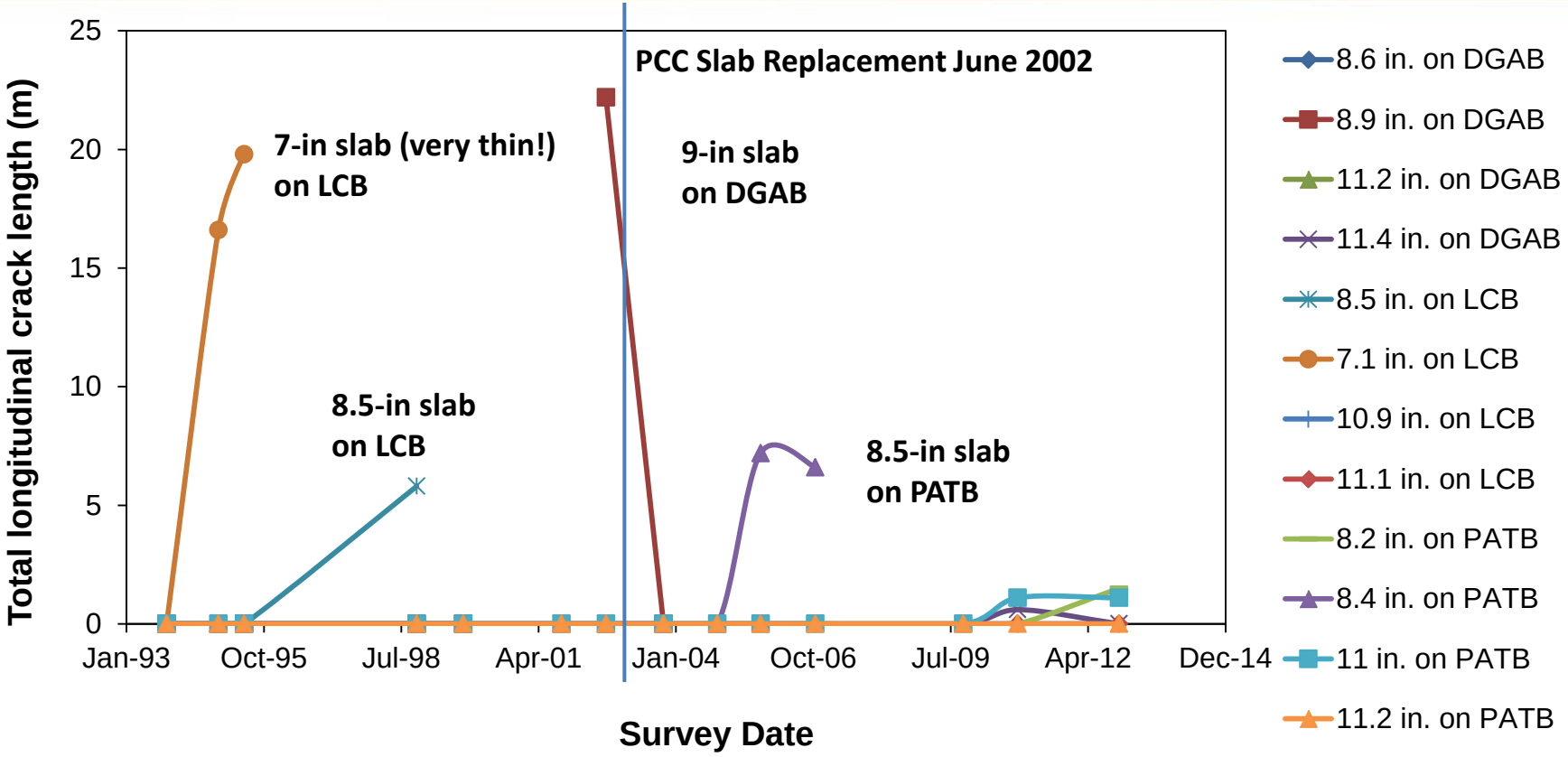
- SPS-2 experiment
- AADTT > 2000 trucks/day
- Wet-freeze climatic zone

% Slabs Cracked Transversely (SPS-2 Michigan)



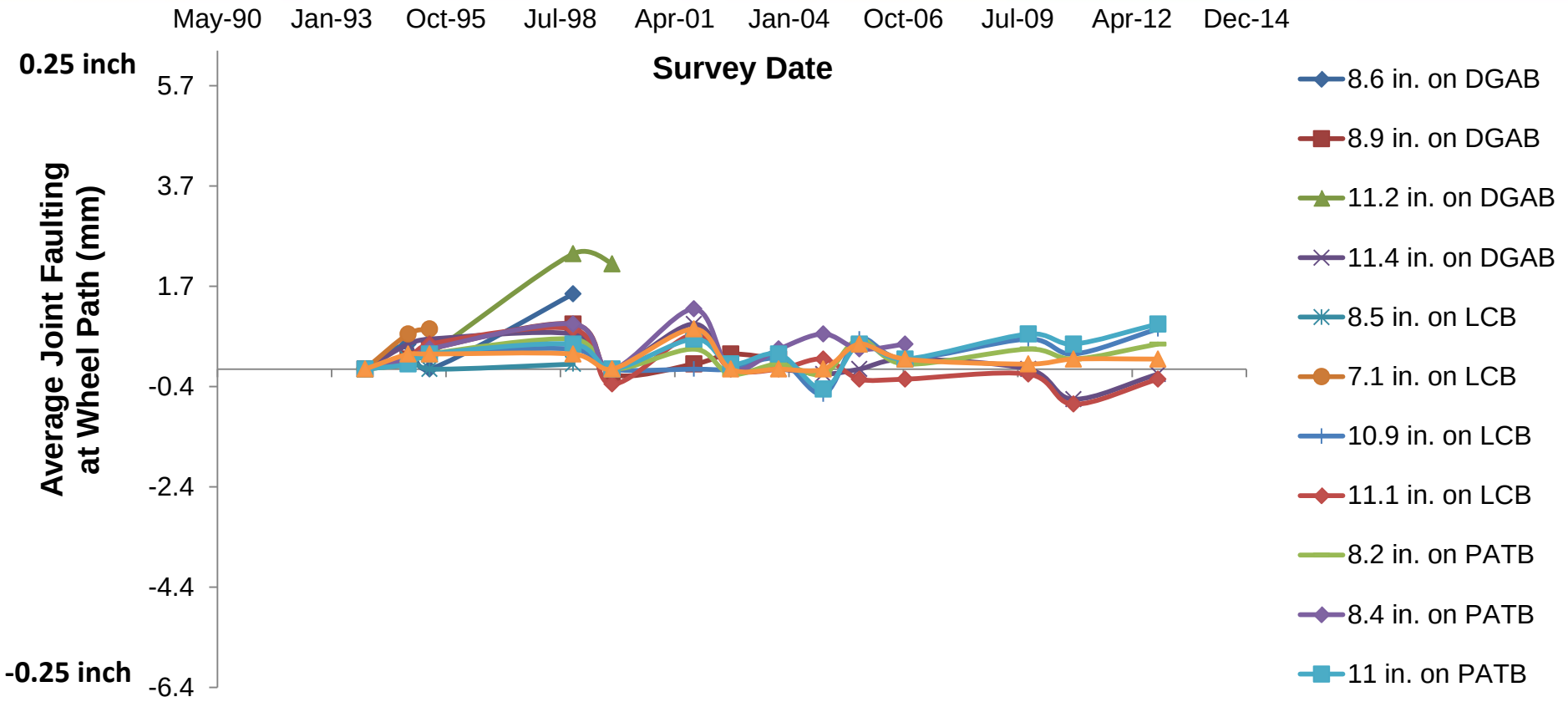
DGAB: Dense-graded aggregate base
LCB: Lean Concrete Base
PATB: Permeable asphalt-treated base

Longitudinal Crack Length (SPS-2 Michigan)



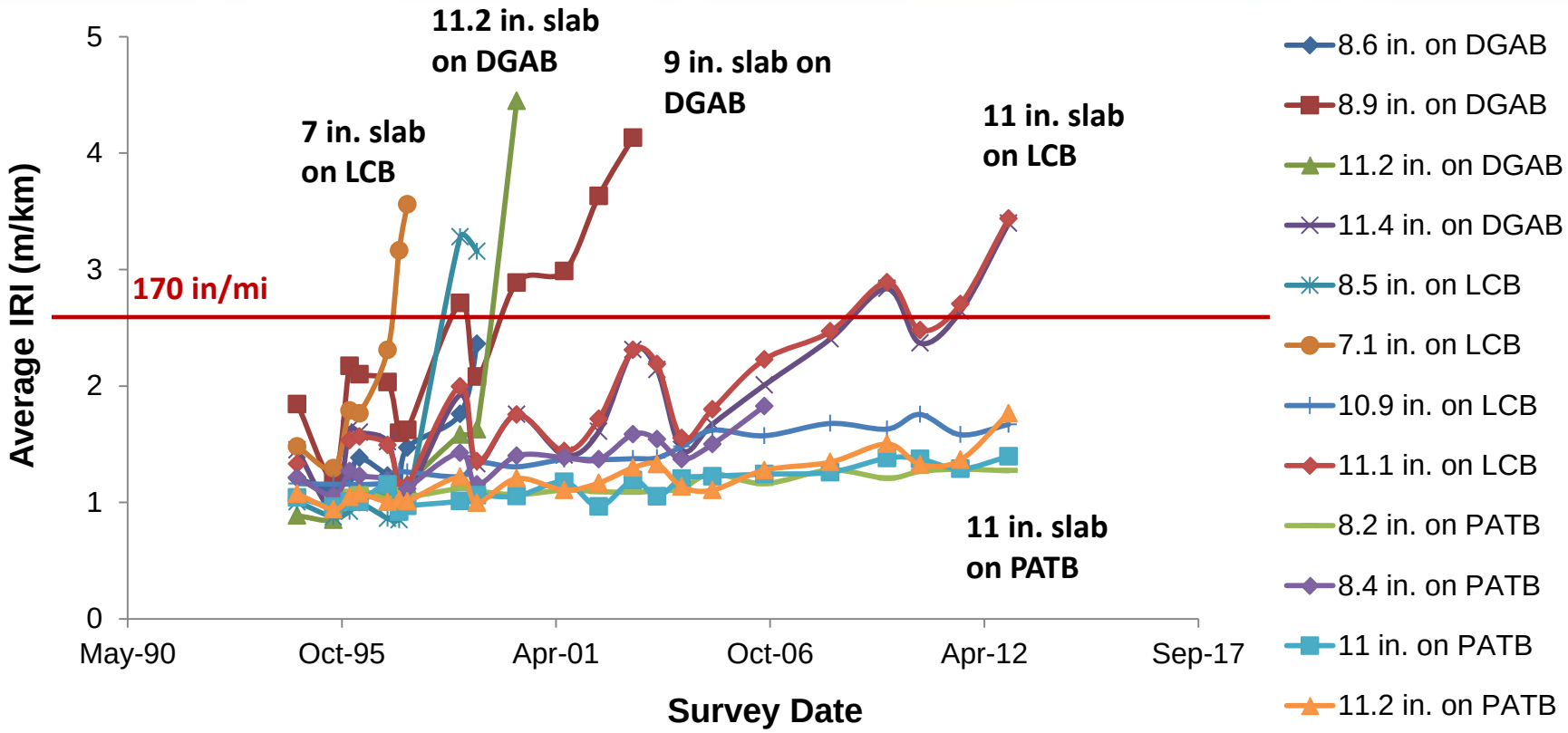
DGAB: Dense-graded aggregate base
LCB: Lean Concrete Base
PATB: Permeable asphalt-treated base

Faulting (SPS-2 Michigan)



DGAB: Dense-graded aggregate base
LCB: Lean Concrete Base
PATB: Permeable asphalt-treated base

IRI (SPS-2 Michigan)



DGAB: Dense-graded aggregate base
LCB: Lean Concrete Base
PATB: Permeable asphalt-treated base

Sample Application Findings

On Michigan SPS-2 site:

- The very thin slab (7”) has exhibited higher amount of transverse and longitudinal cracking
- Base type does not seem to have affected amount of cracking
- The amount of faulting is negligible (less than 1/8”) on all sections
- Drainage in asphalt treated bases has reduced the amount of roughness compared to other types of base layers

EXTRACTING INFORMATION OUT OF LTPP DATA

- Proposed MAP-21 requirements
  - Establish performance targets
  - Develop a data quality management program
- Develop pavement performance models
- Set performance-based pay adjustment factors
- Evaluate effectiveness of maintenance and rehabilitation
- Generate the inputs for AASHTOWare Pavement ME Design Software

DISCUSSION

1. Any other suggestions to facilitate data visualization?
2. How to help new users get familiar with the website?
    - www.InfoPave.com: Help → How To Videos
    - www.InfoPave.com: Help → Application Samples
3. Other problems that could be solved using LTPP data?
4. How to provide preliminary evaluations to identify availability of data for specific research topics?

Please submit your feedback at http://www.infopave.com/Help/CustomerSupport or email to ltppinfo@dot.gov.

InfoPave Help