High RAP Test Sections

Test Track Sponsor meeting
May 25, 2010
Presented by Randy West

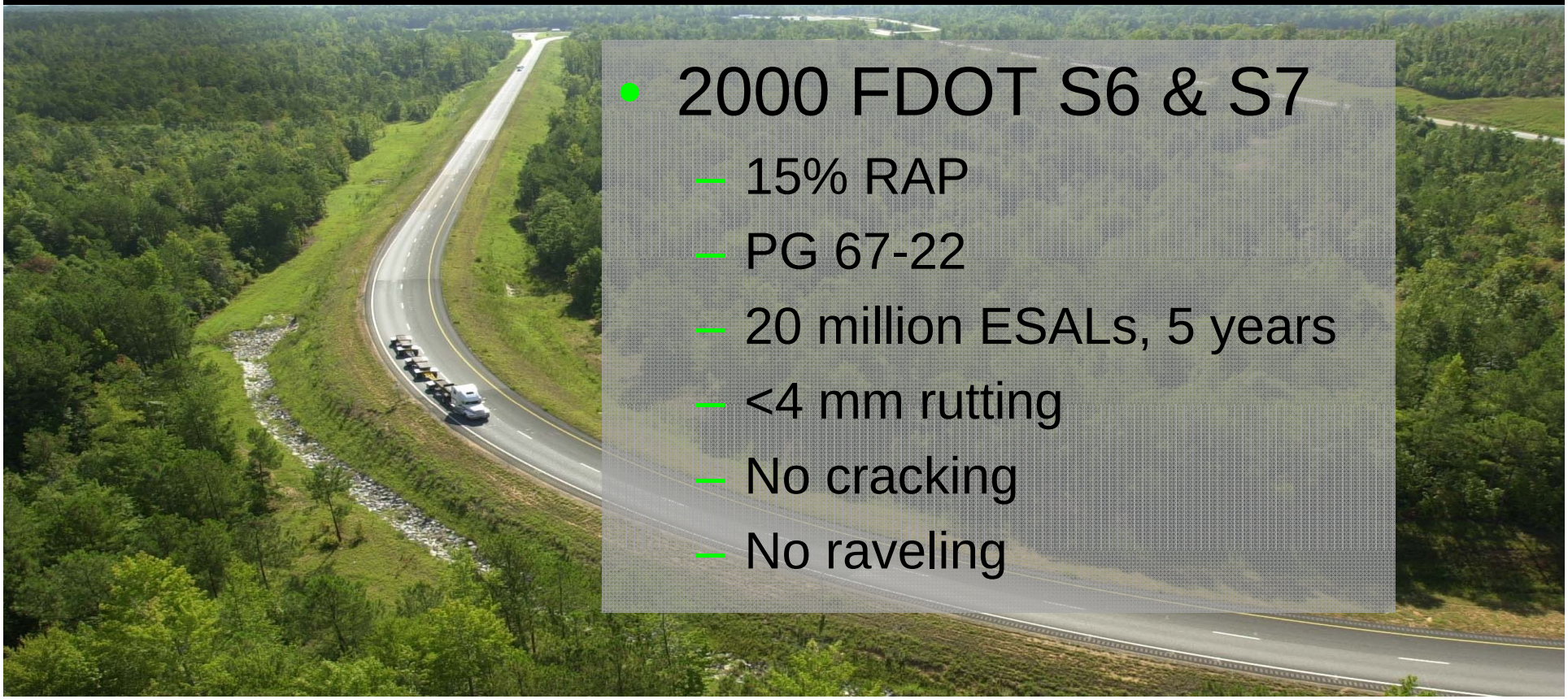
National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Outline

- Review of test sections containing RAP
- Current high RAP sections
- 2006 experiment
- 2009 GE sections
- Completed lab results

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Use of RAP at the NCAT Test Track



- 2000 FDOT S6 & S7
  - 15% RAP
  - PG 67-22
  - 20 million ESALs, 5 years
  - <4 mm rutting
  - No cracking
  - No raveling

Use of RAP at the NCAT Test Track

- 2006 TNDOT S6, MSDOT S2
  - 15% RAP
  - PG 76-22
  - 10 million ESALs
  - No rutting
  - No raveling
  - No cracking on S6
  - Some reflection cracking on S2

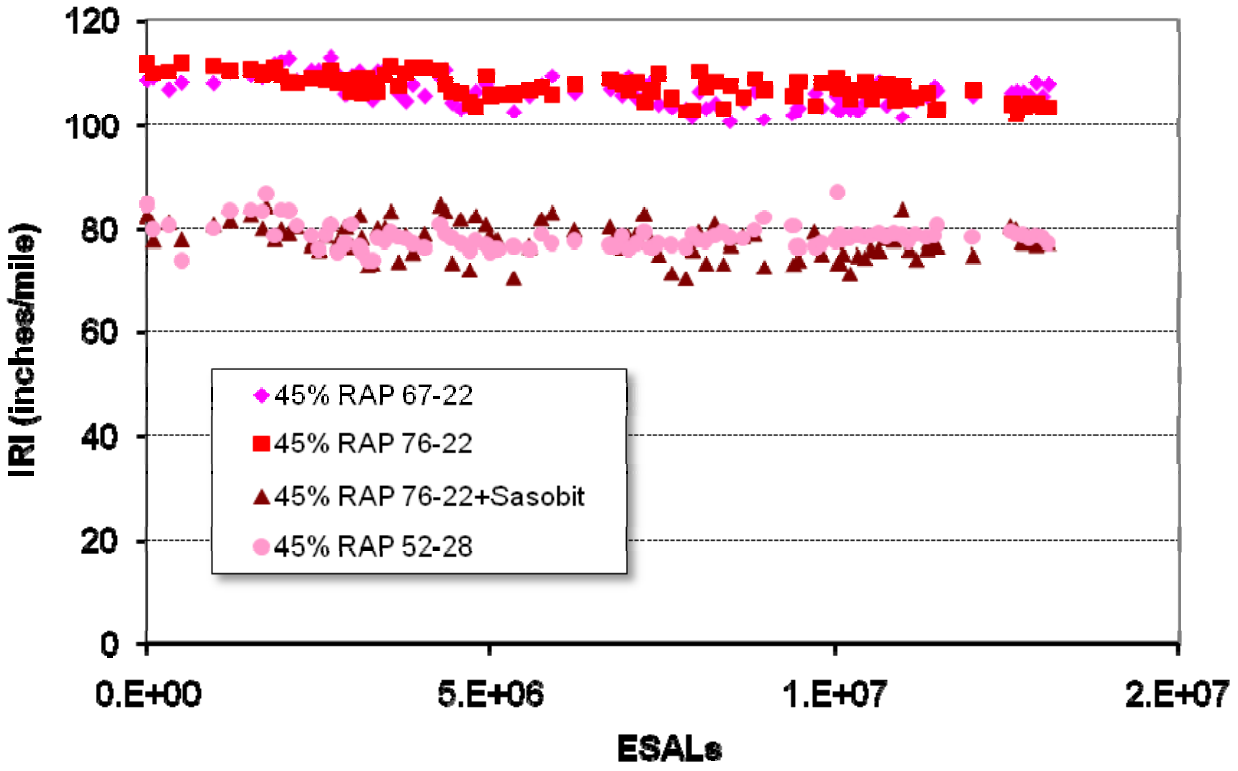
National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

2006 High RAP Experiment Summary

1. 20% RAP with PG 67-22 virgin binder (W4)
2. 20% RAP with PG 76-22 virgin binder (W3)
3. 45% RAP with PG 52-28 virgin binder (W5)
4. 45% RAP with PG 67-22 virgin binder (E5)
5. 45% RAP with PG 76-22 virgin binder (E6)
6. 45% RAP with PG 76-22 + Sasobit (E7)
7. virgin control mix with PG 67-22 (N5)

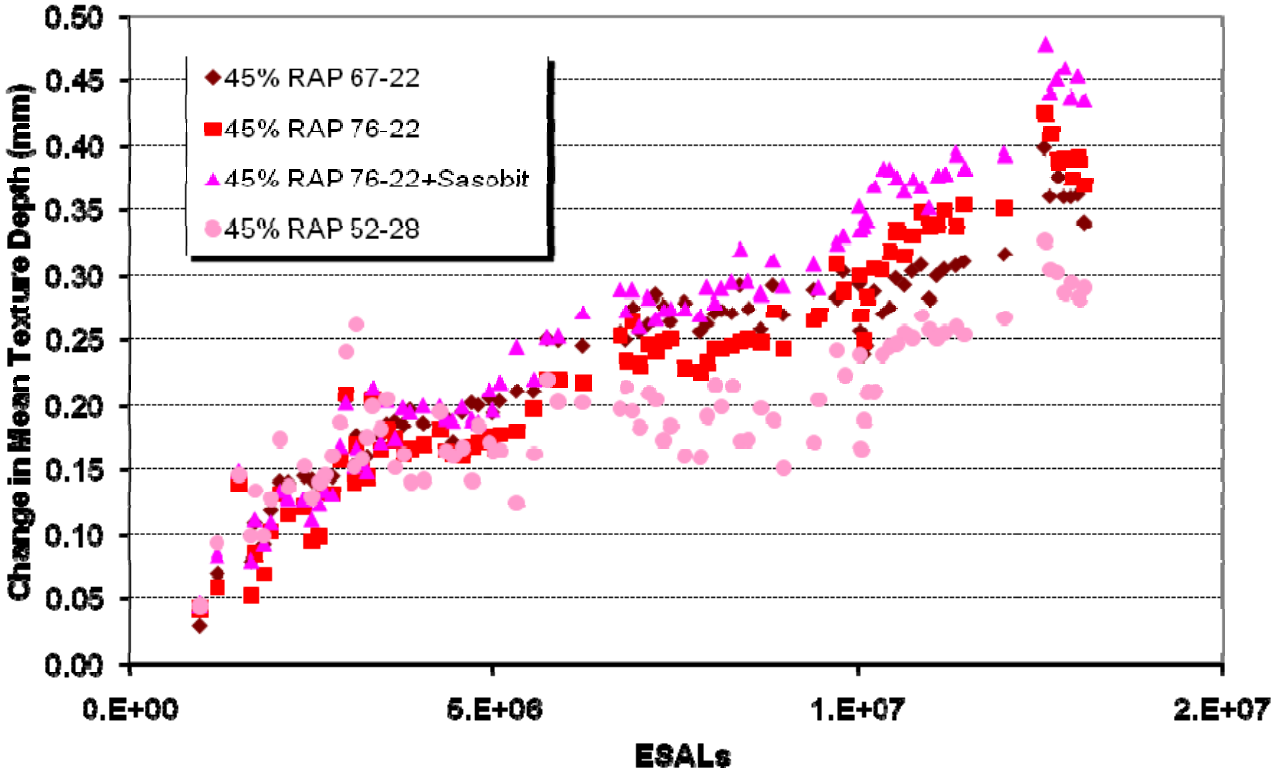
National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

International Roughness Index



National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Change in Texture



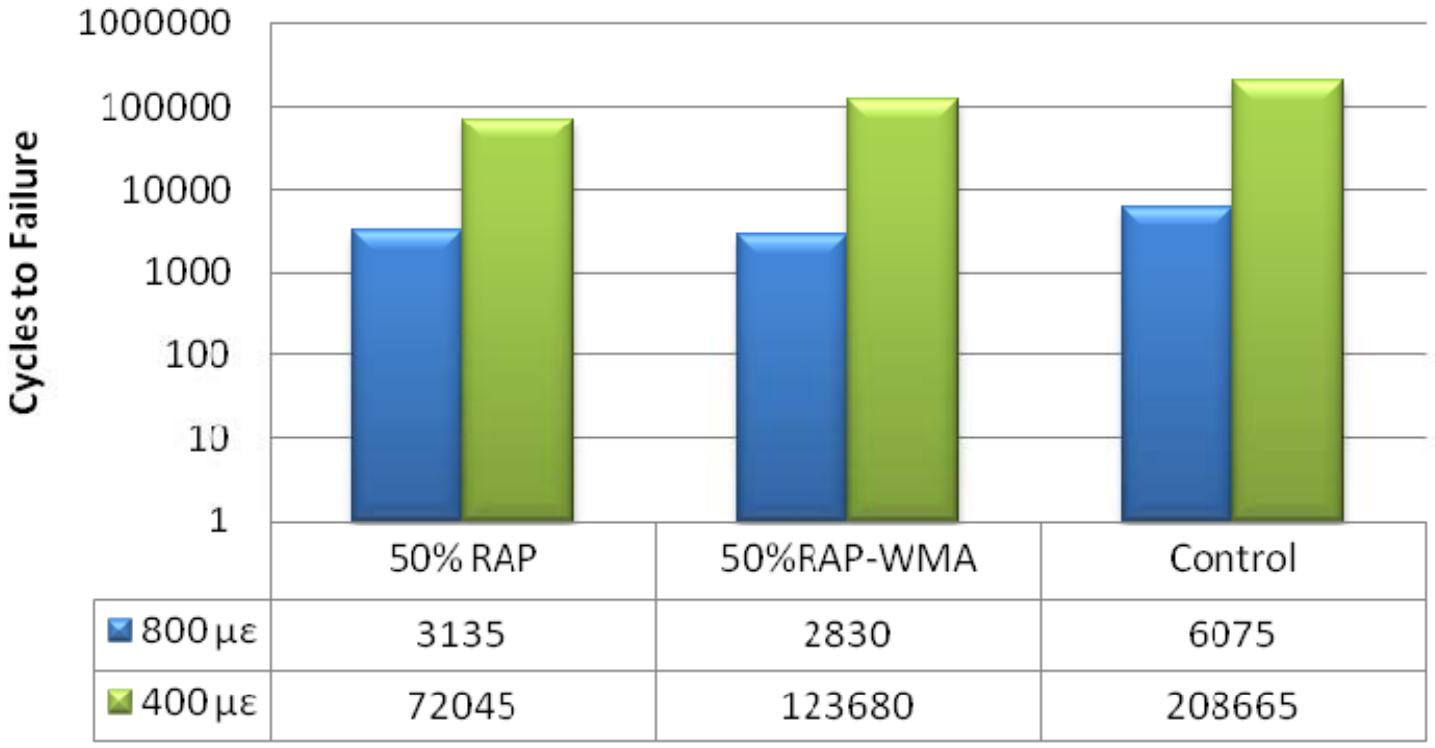
National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

2009 High RAP Test Sections

- MSDOT: S2, Two 2” lifts, 45% RAP, PG 67-22 virgin binder
- Group Exp. High RAP: N10, 50% RAP in each of 3 lifts, PG 67-22 virgin binder
- Group Exp. High RAP/WMA combo: N11, 50% RAP in each of 3 lifts, DBG foamed PG 67-22 virgin binder

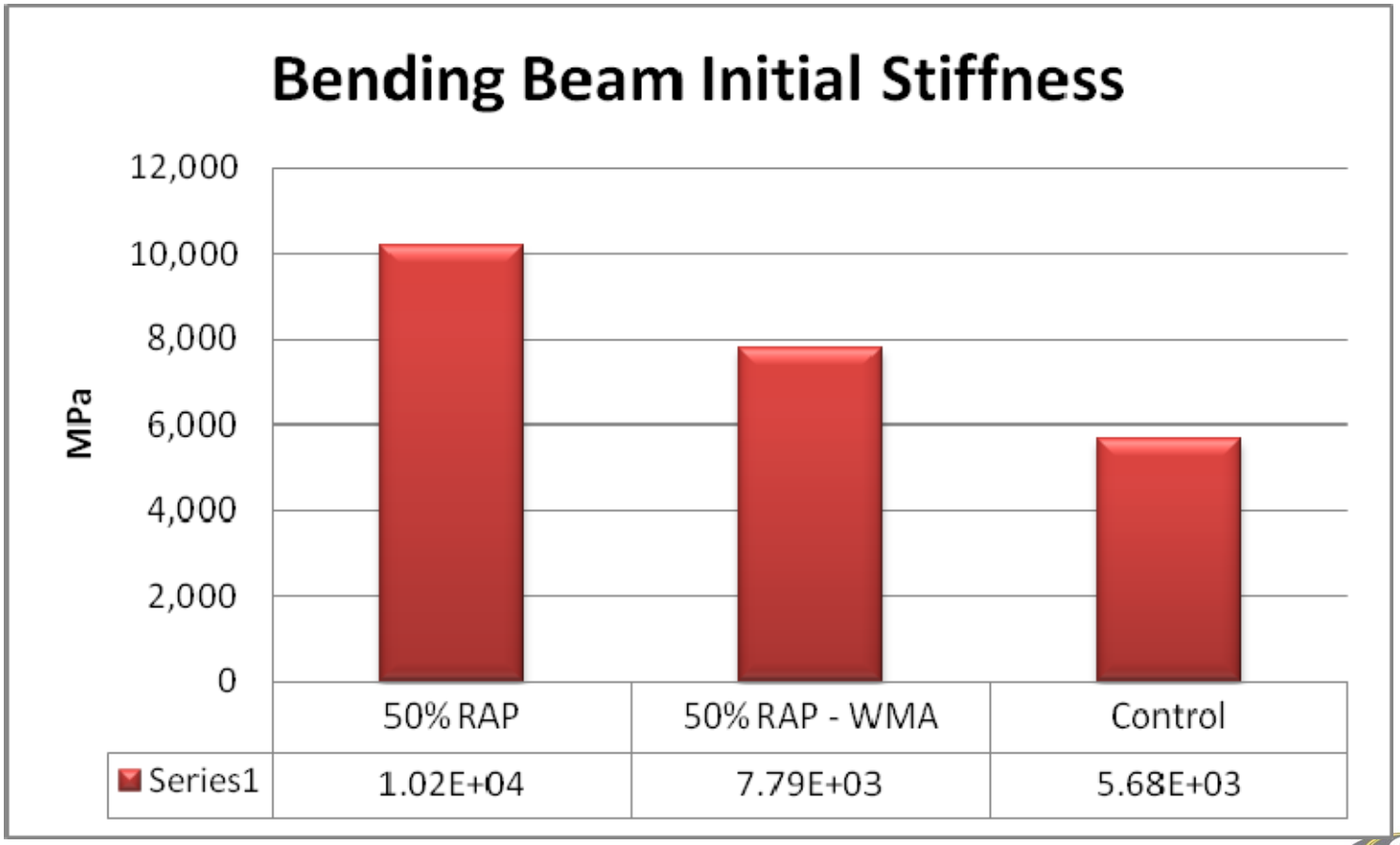
National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Bending Beam Fatigue Results

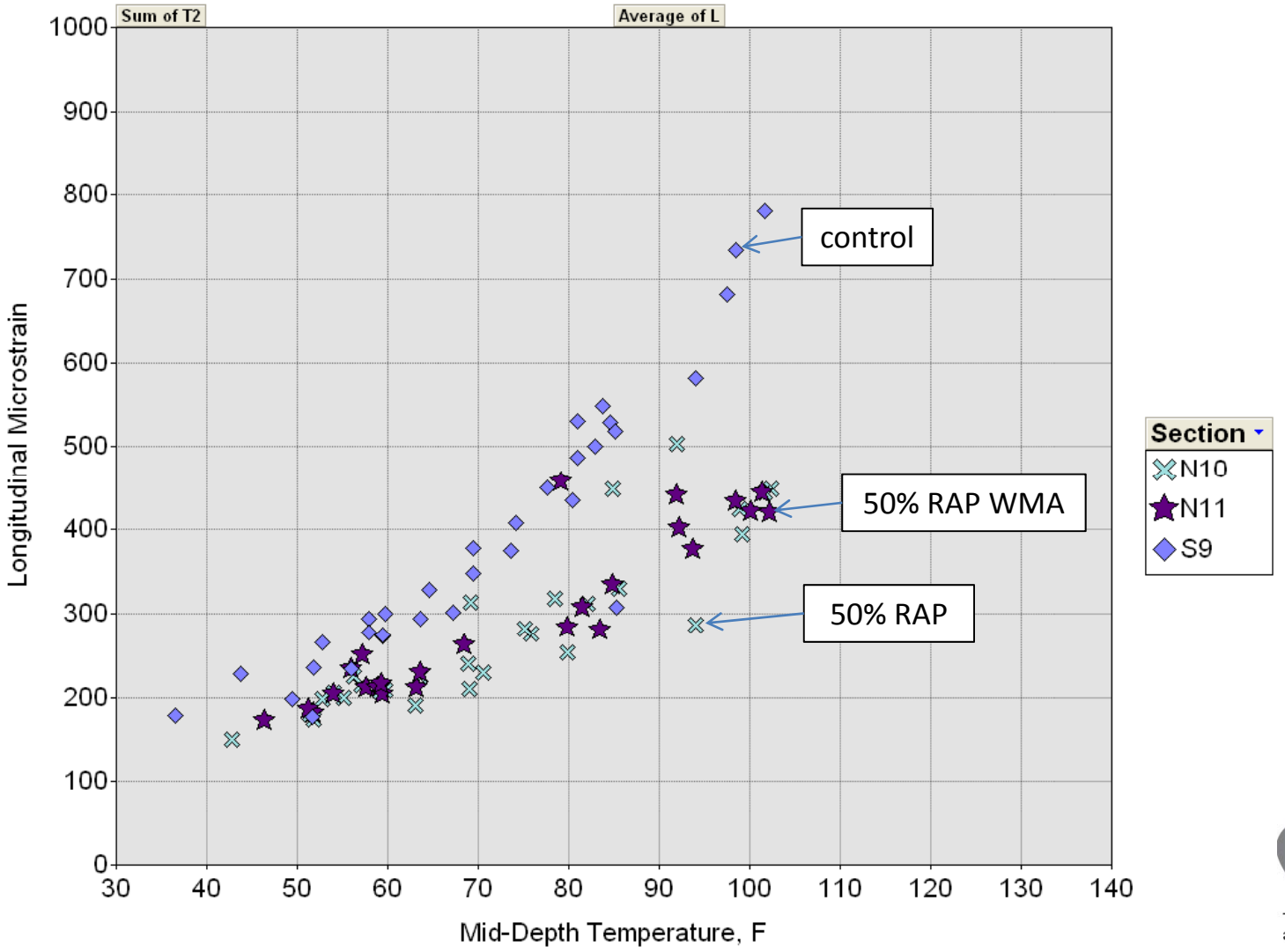


	50% RAP	50%RAP-WMA	Control
800 με	3135	2830	6075
400 με	72045	123680	208665

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY



National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY



National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Recovered Binder Continuous Grades

- 50% RAP
  - Surface: 87.8-15.4
  - Base: 95.0-12.8
- 50% RAP – WMA
  - Surface: 83.8-17.7
  - Base: 88.7-14.1
- 45% RAP (MSDOT)
  - Surface: 90.0-18.6

National Center for Asphalt Technology NCAT at AUBURN UNIVERSITY

Current Observations on the High RAP Test Sections

- The 2006 45% sections continue to perform well with minor cracking *except* in W5 (45% RAP w/ PG 52-28)
- No distresses evident on the 2009 High RAP sections or the control section
- Lab tests show High RAP sections/mixes are much stiffer. Lower lab fatigue life could be offset by lower strains.

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY

Current Observations on the High RAP Test Sections

- WMA with RAP appears to be beneficial:
  - Improved lab fatigue life
  - Lower initial stiffness in fatigue test
  - Similar strain levels in the field
  - Lower recovered binder grade (less oxidation during production?)

National Center for Asphalt Technology
NCAT
at AUBURN UNIVERSITY


National Center for
Asphalt Technology
NCAT
at AUBURN UNIVERSITY