Hot Topics Illinois

2015 Joint Annual Bituminous Conference / North Central Asphalt User Producer Group Technical Conference

Jim Trepanier
HMA Operations Engineer
Illinois Dept. of Transportation

Illinois Department of Transportation

Maximizing Recycle & Durability

Max Asphalt Binder Replacement

HMA Mixtures [1/, 2/]	FRAP/RAS Maximum ABR %		
Ndesign	Binder/Leveling Binder	Surface	Polymer Modified [3/, 4/]
30	50	40	10
50	40	35	10
70	40	30	10
90	40	30	10

Max RAS 5.0% BTWM

Max Asphalt Binder Replacement

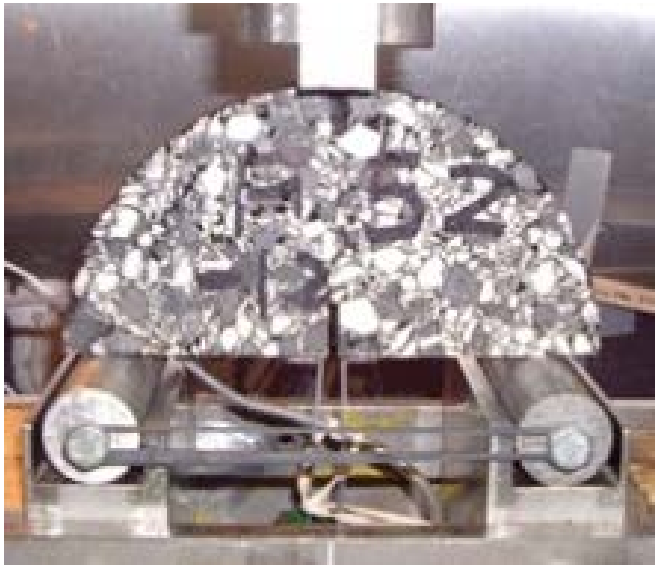
- Max ABR in SMA 20%
- Max ABR in IL-4.75 30%
- Grade Bump High & Low Temp ↓ 1 Grade when ABR > 20% (Chicago District at 15%)

Maximizing Recycle & Durability

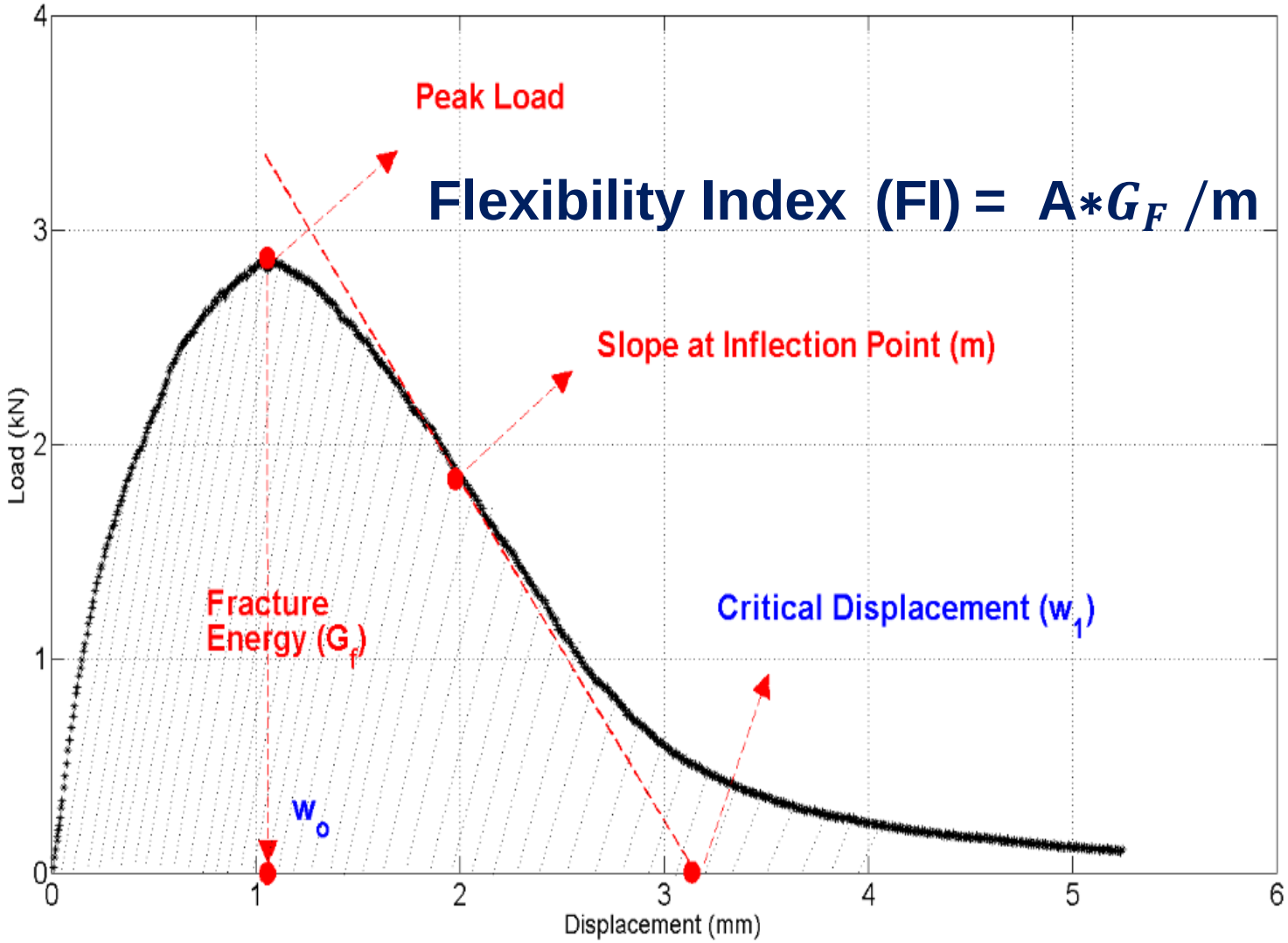
- Illinois Experiencing Early Reflective Cracking Related to:
  - High Levels of Recycle
  - Harsh Winter of 2014
  - Underlying Conditions
- FHWA directed IL to Follow PP-78 (i.e. Use Asphalt Binder Availability Factor between 70 & 85% for RAS)

New HMA Brittleness Test

- Illinois Center for Transportation (ICT) Research Project *R27-128 "Testing Protocols to Ensure Performance of High Asphalt Binder Replacement Mixes Using RAP & RAS"*
  - Identify a Test Method to Measure Brittleness
    - Inexpensive
    - Simple to Run
  - Modified SCB
    - Room Temp
    - Fast Loading Rate
    - Split Tensile Loading Frame
    - "Flexibility Index" (FI)

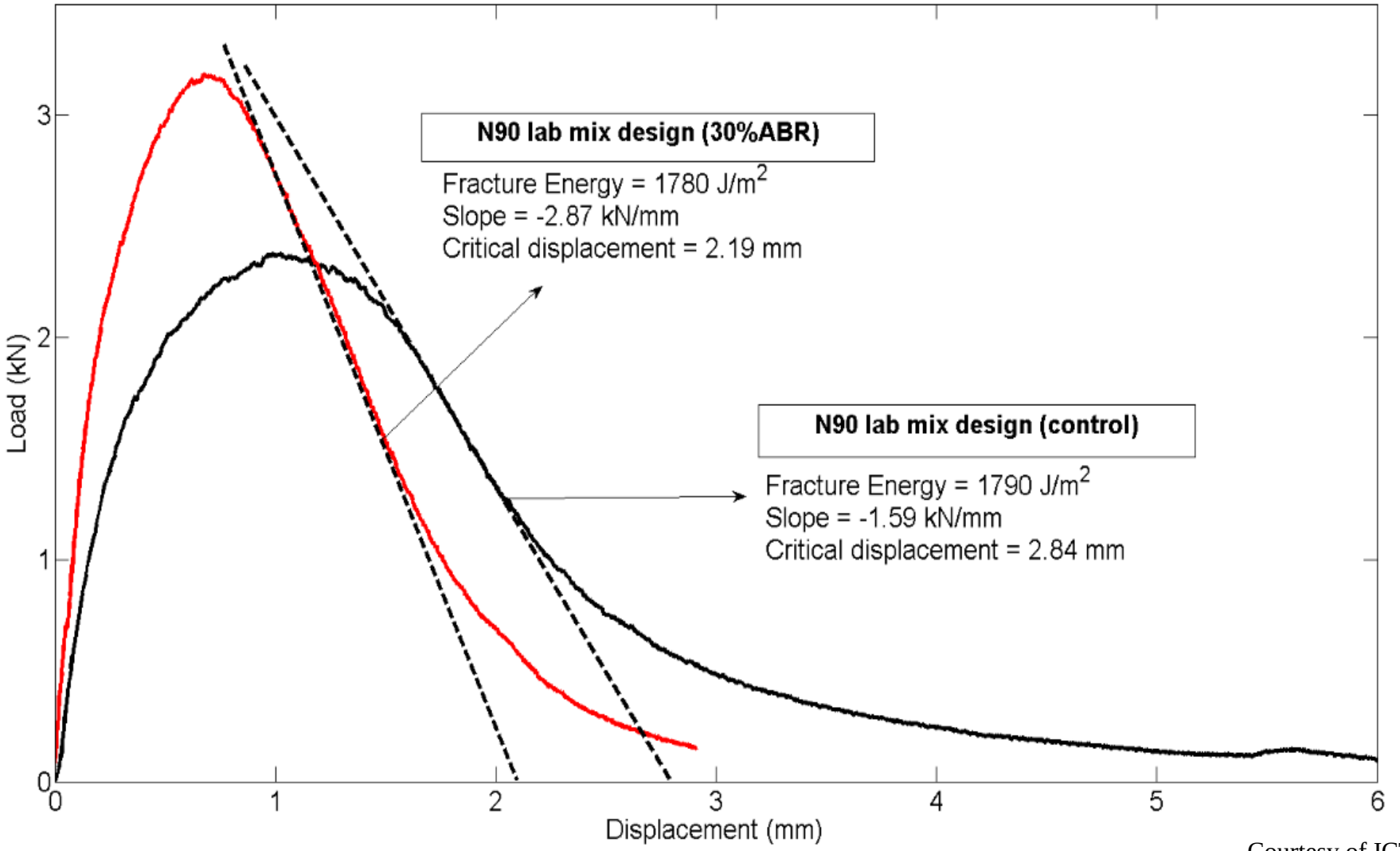


Flexibility Index



Courtesy of ICT

Which Mix is Less Brittle?



Courtesy of ICT

New Tack Coat Specification

Why?

Non-Uniform Application = Weak Bond

Tack Coat Research Reports

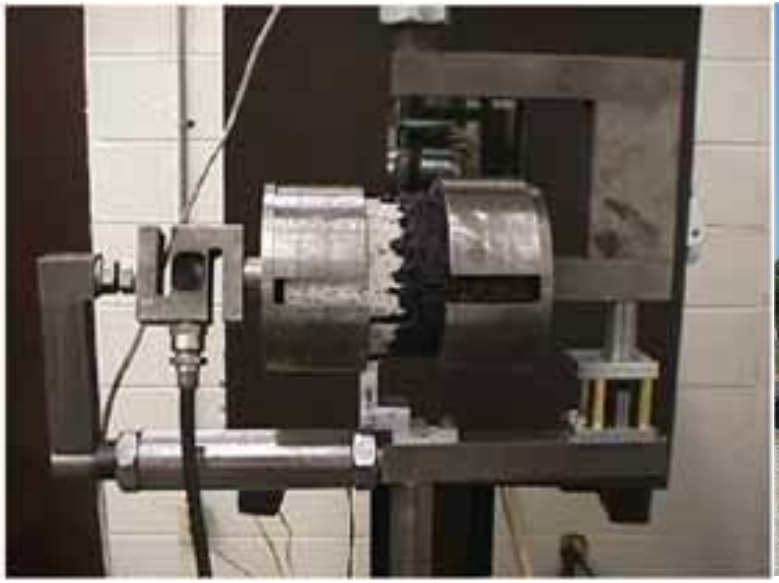
- Two Illinois Center for Transportation (ICT) research projects:
  - Phase I: ***Tack Coat Optimization for HMA Overlays***
    - Lab Testing: ICT 08-023
    - Accelerated Pavement Testing: ICT 09-035
  - Phase II: ***Best Practices for Implementation of Tack Coat***
    - Lab Testing: ICT 12-004
    - Field Study: ICT 12-005

Researched Topics

- Residual Asphalt Binder Application Rates
- Surface types and textures
  - Concrete (tined, milled, smooth)
  - HMA (milled, smooth)
- Application Uniformity (i.e. zebra stripes vs uniform)
- Cure time
- Demonstrated Spray Paver
- Variety of Tack Coat Products
  - SS-1h, SS-1hp, PG64-22, RC-70, SS-1vh
- Cleaning Techniques
  - Brooming
  - Air Blasting

Researched Topics

- Bond Strength testing for all scenarios
  - Lab shear tester
  - ATLAS Sections equipped w/ Strain Gauges



Accelerated Pavement Testing

Compact HMA over strain gauge

Specification Features

- Adds new product SS-1vh (i.e. trackless tack)
- RC-70 limited to Temps < 60° F
- Allows Spray Paver in lieu of Conventional Pressure Distributor
- Deleted Requirement: ***"Dilute emulsion with equal volume of water"***
- Contractor selects desired dilution
- **Dilution can only be performed by emulsion supplier**

Specification Features

- Cleaning:
  - Sweeping and Air Blasting or
  - Sweeping and Vacuum Sweeping (Urban Areas)
- Application Rates:
  - Based on **Residual** Asphalt Binder
  - **Much** Higher Rates than Before

Type of Surface to be Primed	Residual Asphalt Rate lb/sq ft (kg/sq m)
Milled HMA, Aged Non-Milled HMA, Milled Concrete, Non-Milled Concrete & Tined Concrete	0.05
Fog Coat between HMA Lifts, IL-4.75 & Brick	0.025

Specification Features

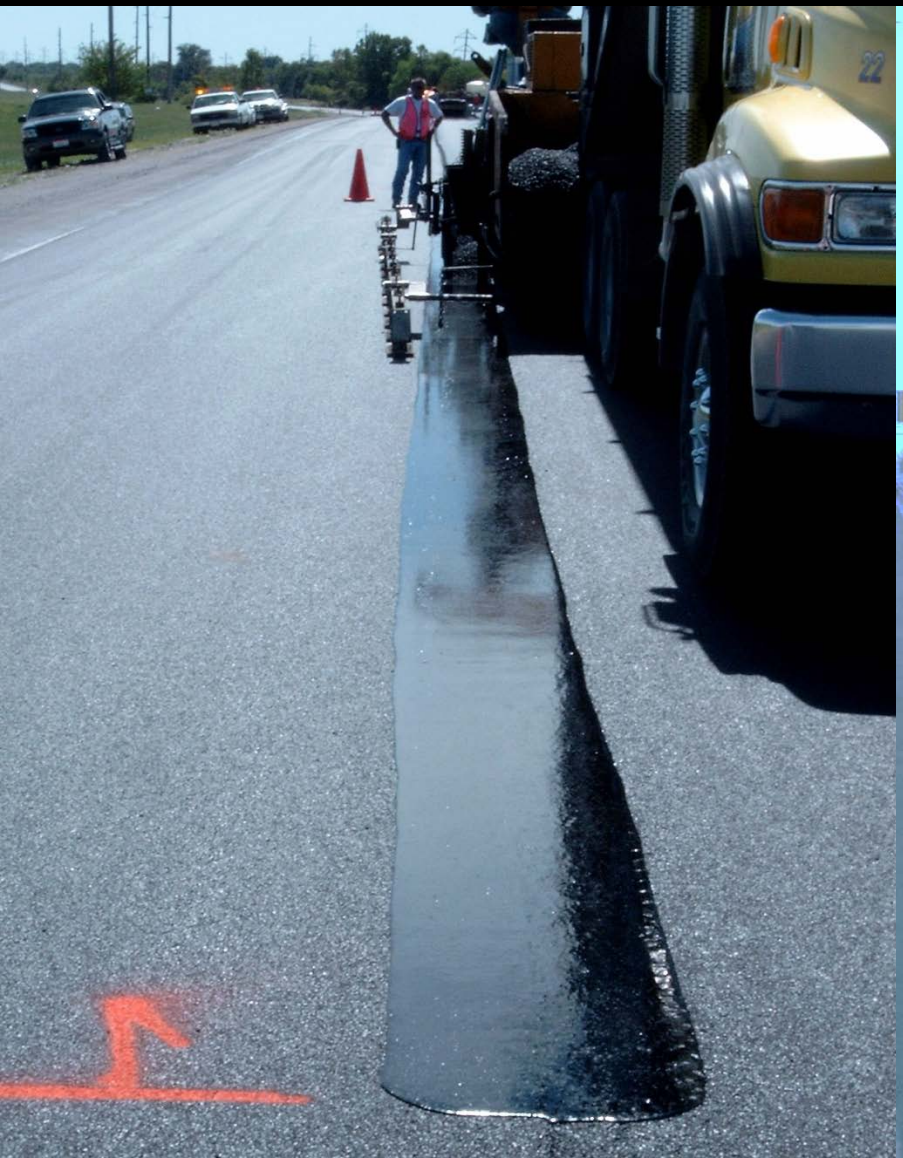
- Lane remains closed until tack coat is **fully cured** & **does not pickup** under traffic
- Paving must stop if pickup occurs & damaged areas repaired before proceeding
- Verification of Residual Binder Application Rate
  - Once /surface type being overlaid when ≥ 2,000 tons
- Payment is based on:
  - Truck weight
  - Net weight of Bituminous Material

Implementation

- Spec used on Voluntary Basis by Districts in 2013 & 2014
- Statewide Spec for 2015

Longitudinal Joints

Longitudinal Joint Seal



Longitudinal Joint Seal 12 Yrs Later

Longitudinal Joint Seal 12 Yrs Later

Future Longitudinal Joint Spec

- Contractor Option:
  - Longitudinal Joint Seal
  - Remove 8 in. of Unconfined Edge & Pave Adjacent Lane 8 in. wider
  - Utilize Confined Edge
  - Pave Full Width or Echelon

Questions

Jim Trepanier

(217) 782-9607 Work
(217) 622-4790 Mobile
James.Trepanier@illinois.gov

Illinois Dept of, Transportation