

I-70

Five Years Later...

Illinois Asphalt Pavement Association
Annual Meeting
March 9, 2009

William J. Pine, P.E.
Emulsicoat, Inc. / Heritage Research



- Joint Venture:
 - Howell Asphalt/Paving
 - Champaign Asphalt
- Project – 10.8 miles
- Rubblized – 9.7 miles
- Cost – \$44.8 Million

Original Cross Section - 1971

8" BAM
Shoulder

8" of "Brand X" (CRCP)

8" BAM
Shoulder

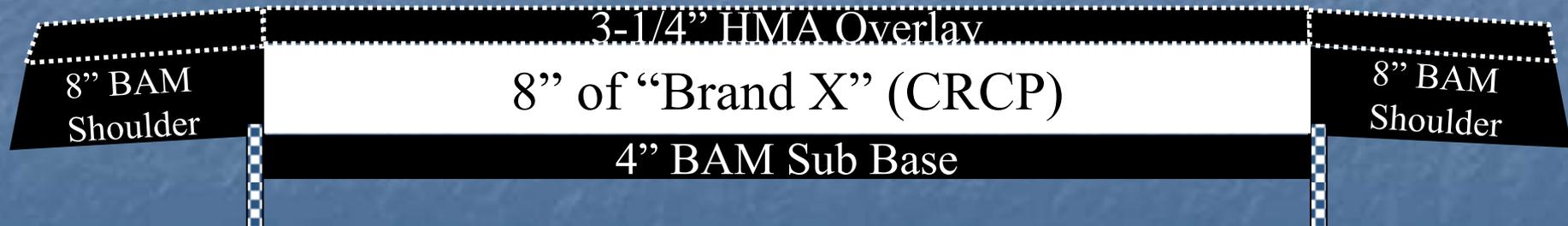
4" BAM Sub Base

Existing Cross Section (Prior to Rehabilitation)

Pavement Distresses:

CRCP D-cracked with Punchouts

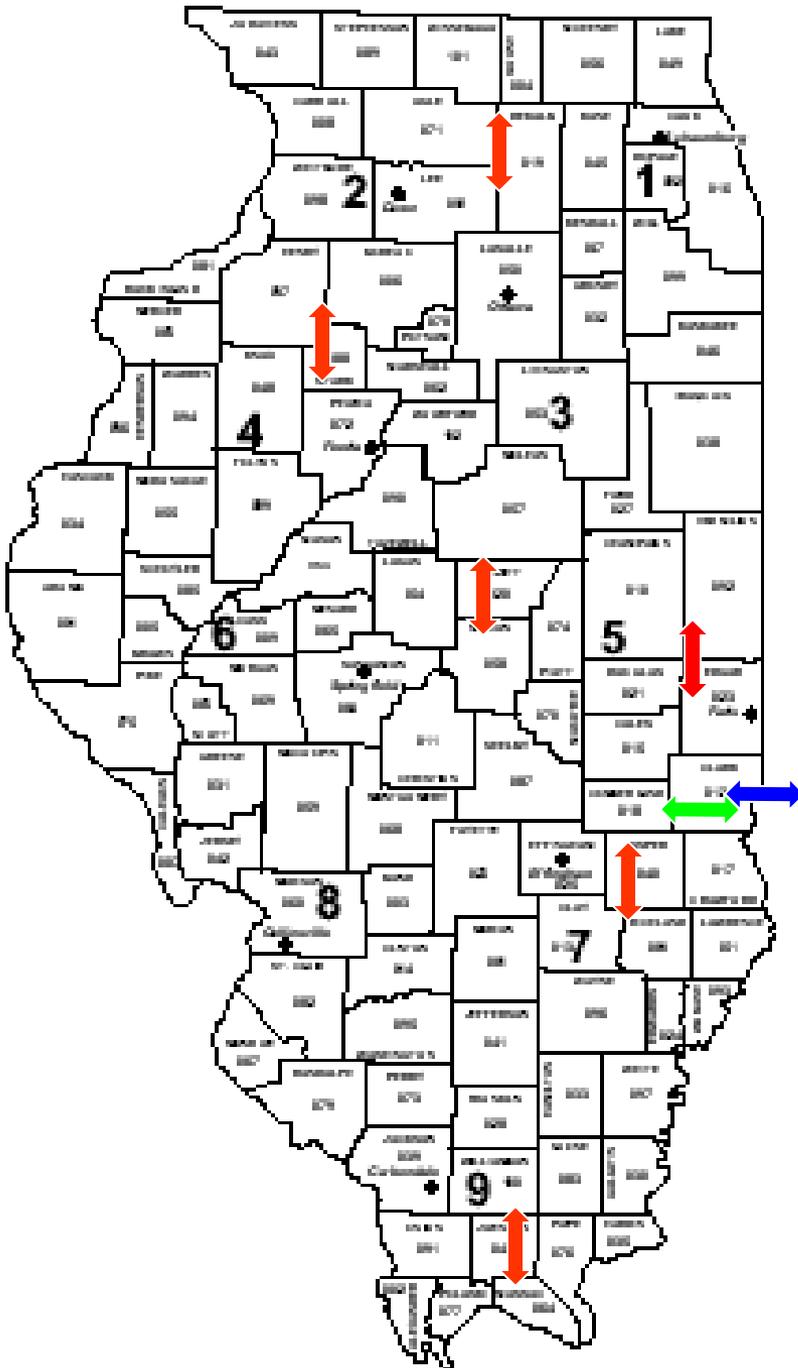
HMA overlay too thin to carry total loading





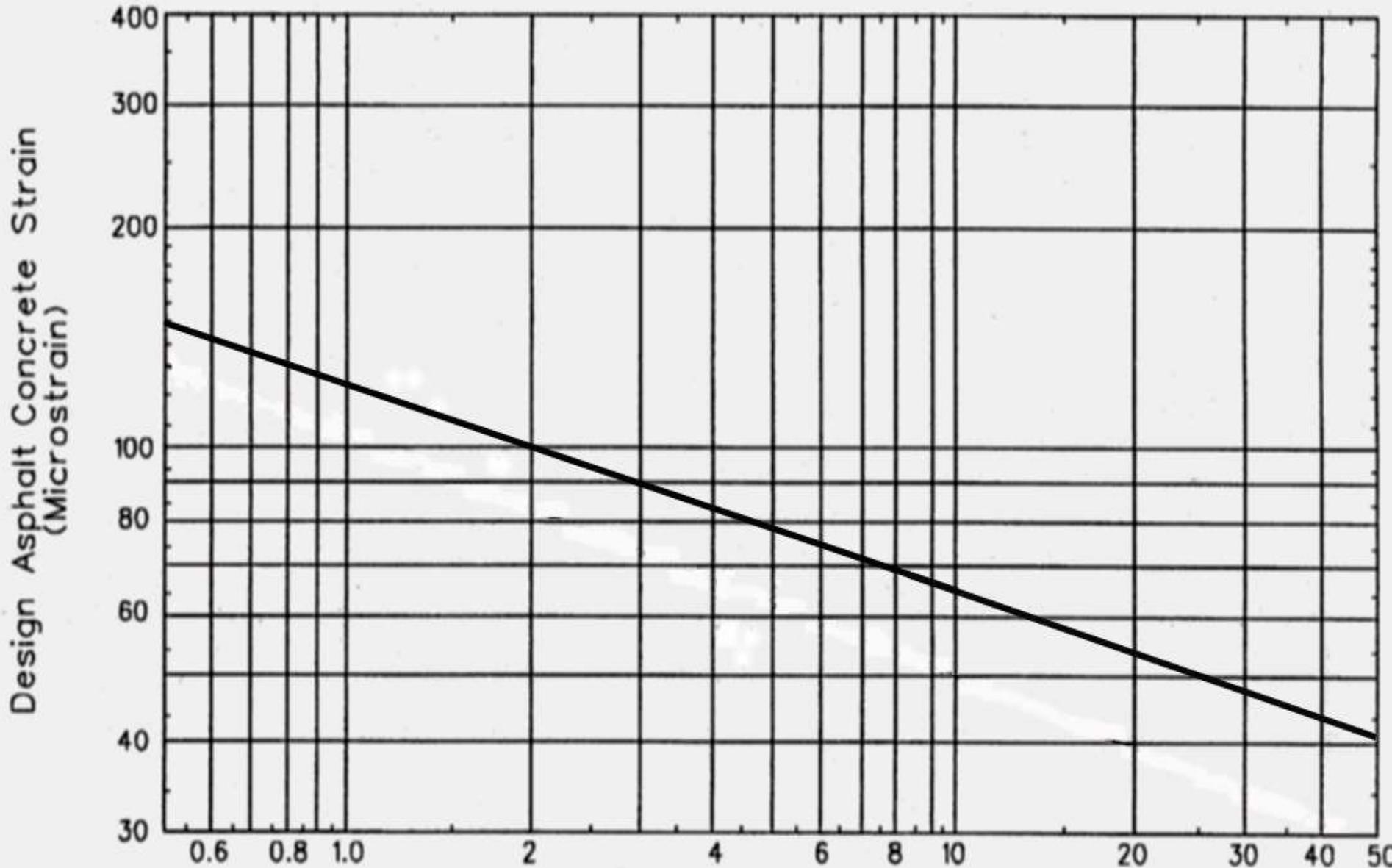
Proposed Rehabilitation

- HMA on Rubblized CRCP
- Traffic Factor = 78.6 million ESAL's
 - 24,000 ADT
 - 49% Trucks
- Determining the Pavement Thickness?



- IDOT Experience with HMA on Rubblized PCCP prior to 2003
 - 1990 I-57 Dist 5 (Pesotum)
 - 1994 IL-38 Dist 2 and I-55 Fr. Rd.
 - 1996 I-57 Dist 7 (Edgewood)
 - 1997 I-57 Dist 9 (Anna)
 - 1997 I-70 Dist 5 (Greenup)
 - 1999 I-74 Dist 4 (Woodhull)

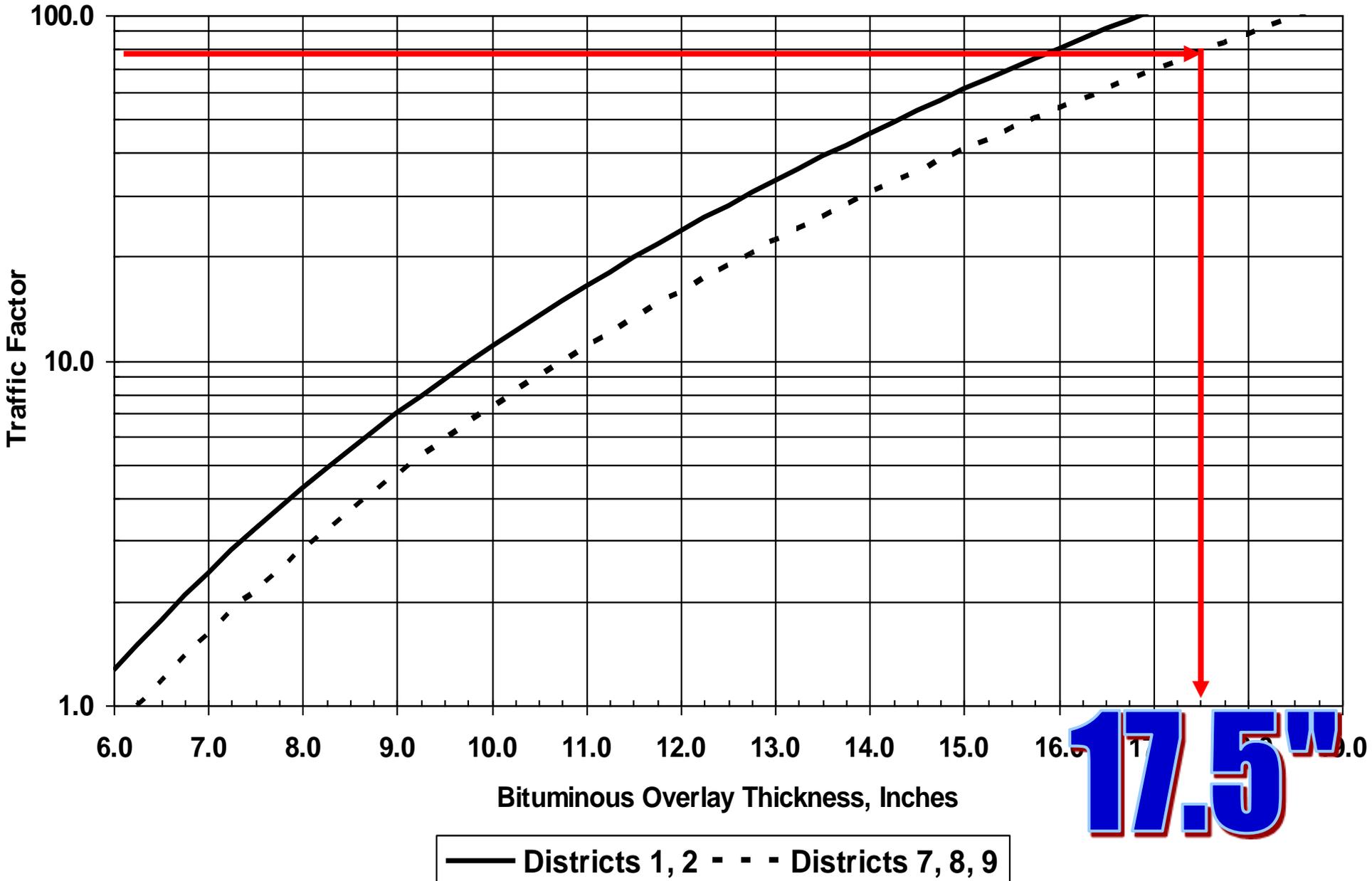
Fatigue Algorithm for Rubblizing



Traffic Factor of 78.6 off the chart!



Bituminous Overlay Thickness for Rubblized Pavements



Project Specific Decisions...

- **Polymer** Mod AC in ALL mainline lifts
 - Reduce perceived risk
- **No** RAP in mainline lifts
 - Typical for back then
 - RAP was allowed in Poly Mod Shoulders
- 4% Void Superpave design for bottom lift

Basic Project Schedule

- Preliminary Work (Fall 2002)
 - Raise Overheads
 - Base Cse Wid & Inlay existing WB Lanes

- Stage 1 (Spring/Summer 2003)

- Traffic "head-to-head" in existing WB lanes
- Rebuild EB lanes

- Stage 2 (Summer/Fall 2003)

- Traffic "head-to-head" in new EB lanes
- Rebuild WB lanes

Everything Done Ahead of Schedule

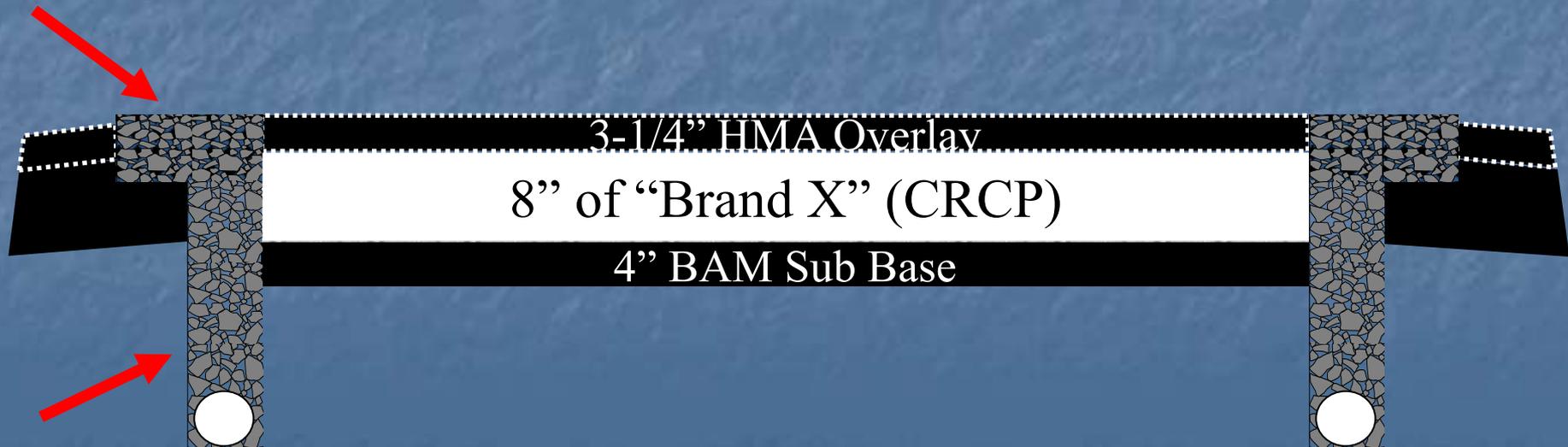
5-Year Warranty

- Warranty Items:
 - Fatigue Cracking
 - Block Cracking
 - Transverse Cracking
 - Longitudinal Cracking
 - International Roughness Index (IRI)
 - Potholes and Shoving
 - Bleeding, Flushing and Raveling
 - Rutting
- Surety Bond Required

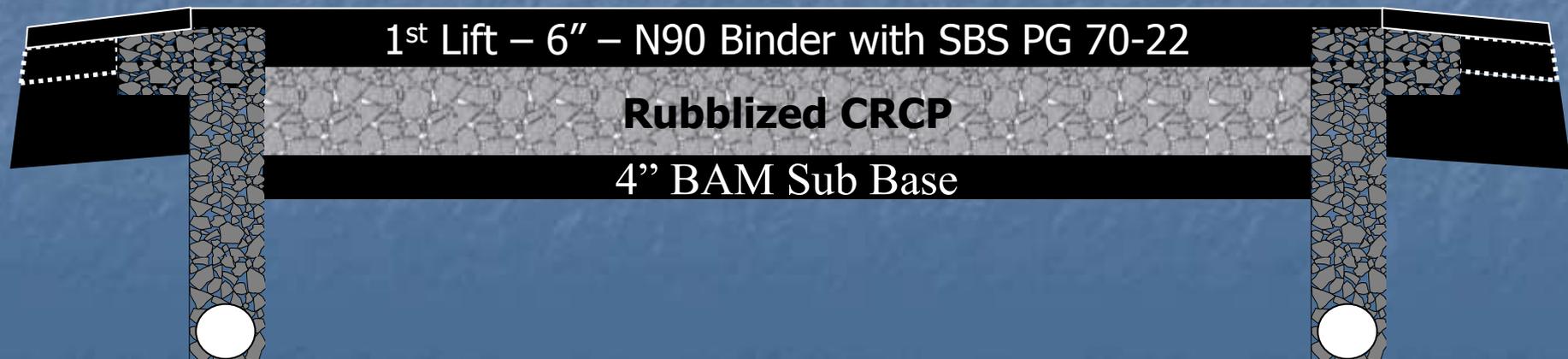
Primary Project Activities

- Replaced Under Drains
- Milled existing 3-1/4" mainline HMA
- Rubblized 8" CRCP
- **17-1/2" HMA pavement** **546,000 tons**
- Replaced concrete decks over Mill Creek
- Raised four overhead structures to accommodate new pavement elevation

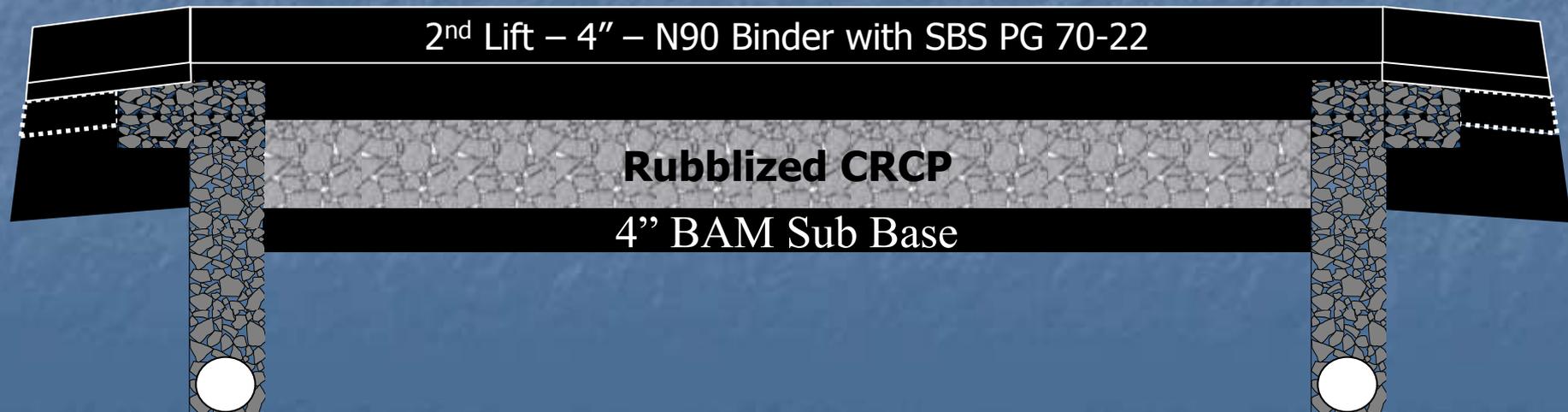
Rehabilitating the Cross Section



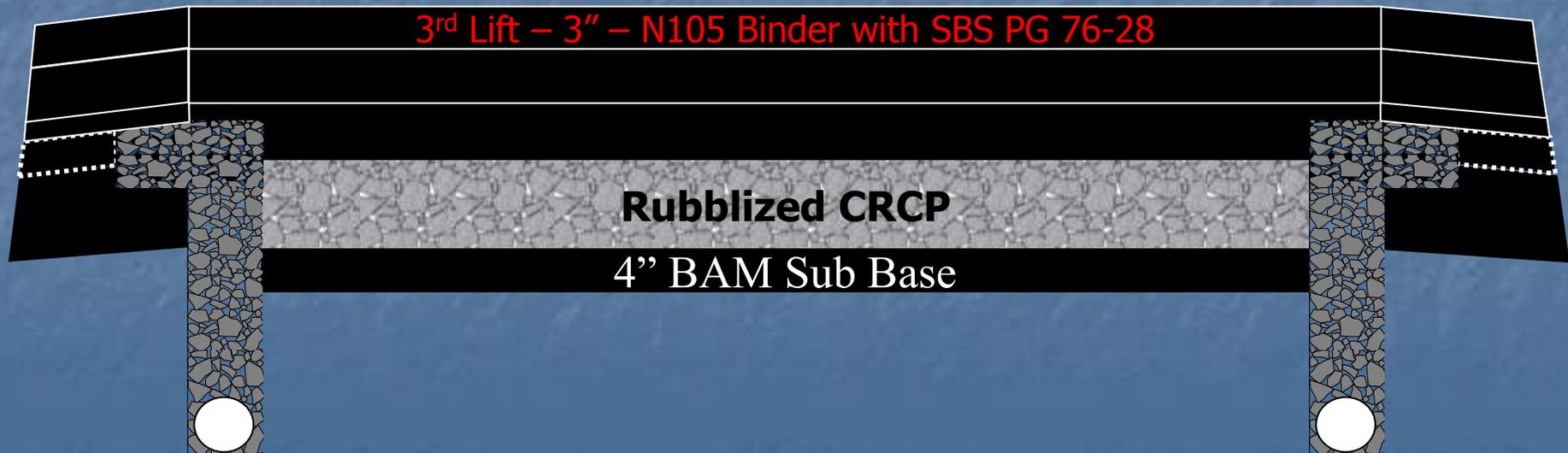
Rehabilitating the Cross Section



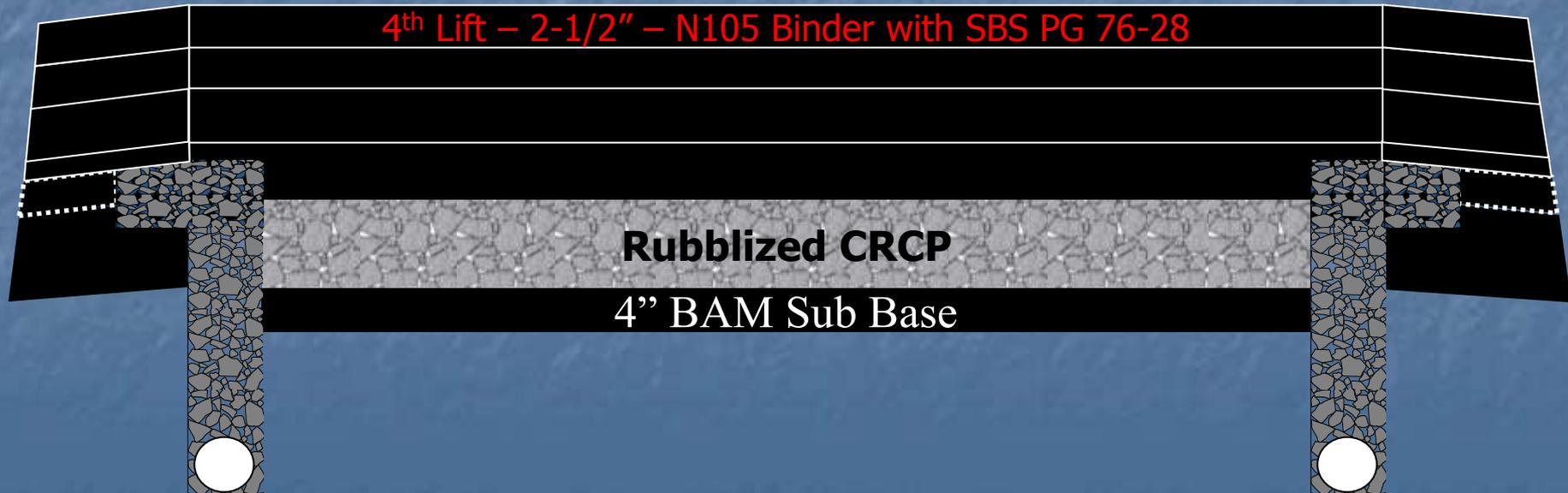
Rehabilitating the Cross Section



Rehabilitating the Cross Section



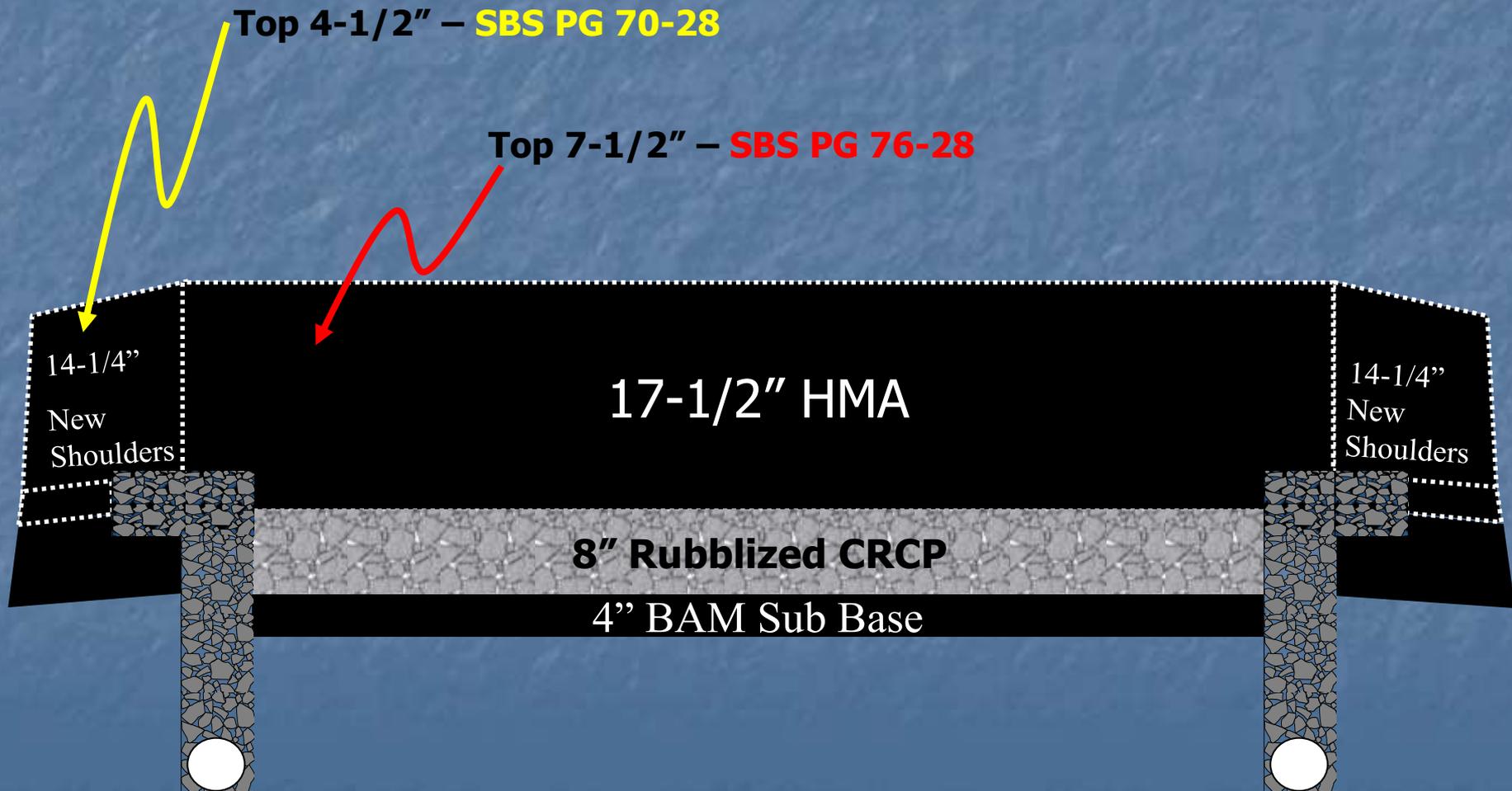
Rehabilitating the Cross Section



Rehabilitating the Cross Section



Final Cross Section













Plus Existing Greenup Plant







58-25008

CHEVROLET





Open House – July 24, 2003



Dr. Thompson

**The Evangelist
of Rubblizing!**





Performance to Date

- Excellent!
- Throughout Warranty Period JV examined and cleaned under drains as needed
- Warranty completed in 2008
 - **NO** work required during the entire 5-year period
 - IRI = 51"/mile (Threshold 110"/mile)
 - Rutting = 0.07" (Threshold 0.30")
- **Reward for the Risk!**

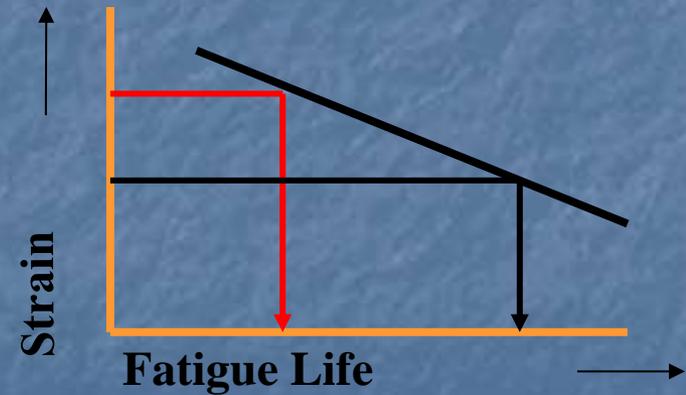
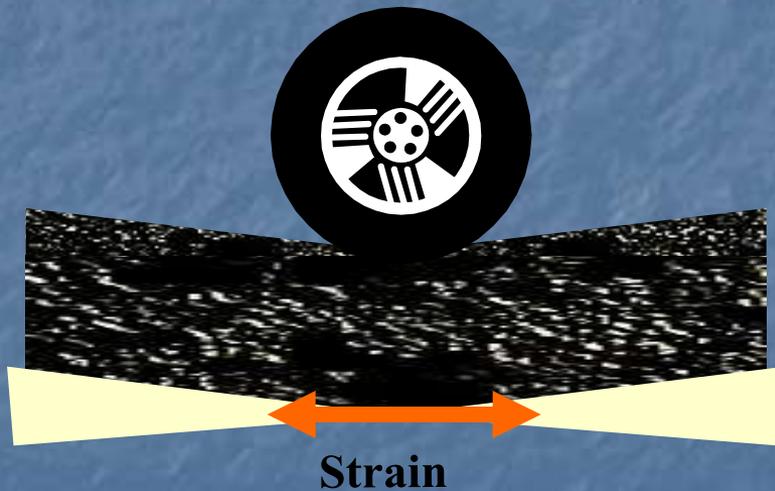
What Have We Learned Since?

- HMA Fatigue...
 - U of I has years of data to show our “old” way is very conservative
 - U of I and others have proved the fatigue endurance limit is real
 - Based on these two points, a new graph has been developed and proposed

Classical Fatigue Theory

High Strain = Short Life

Low Strain = Long Life

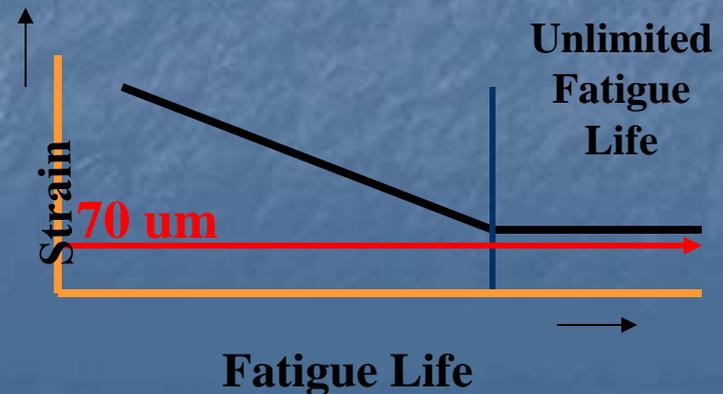
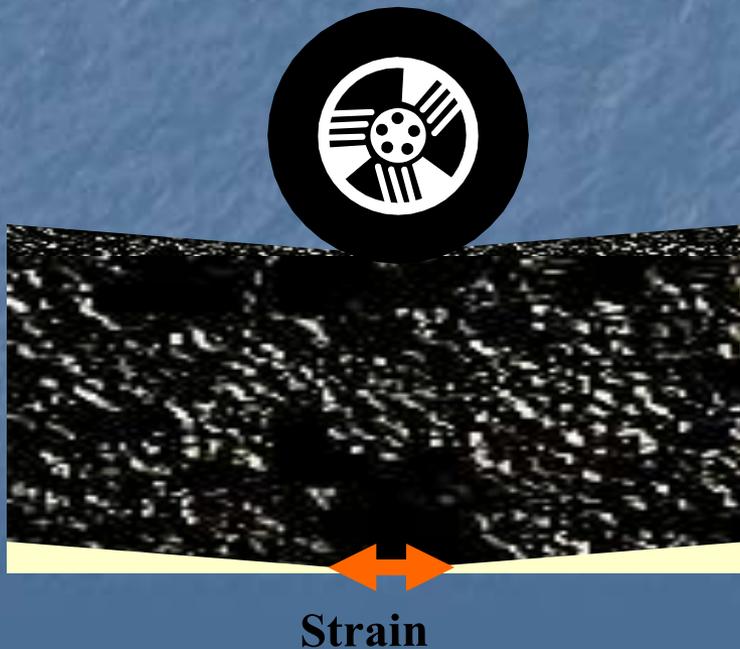


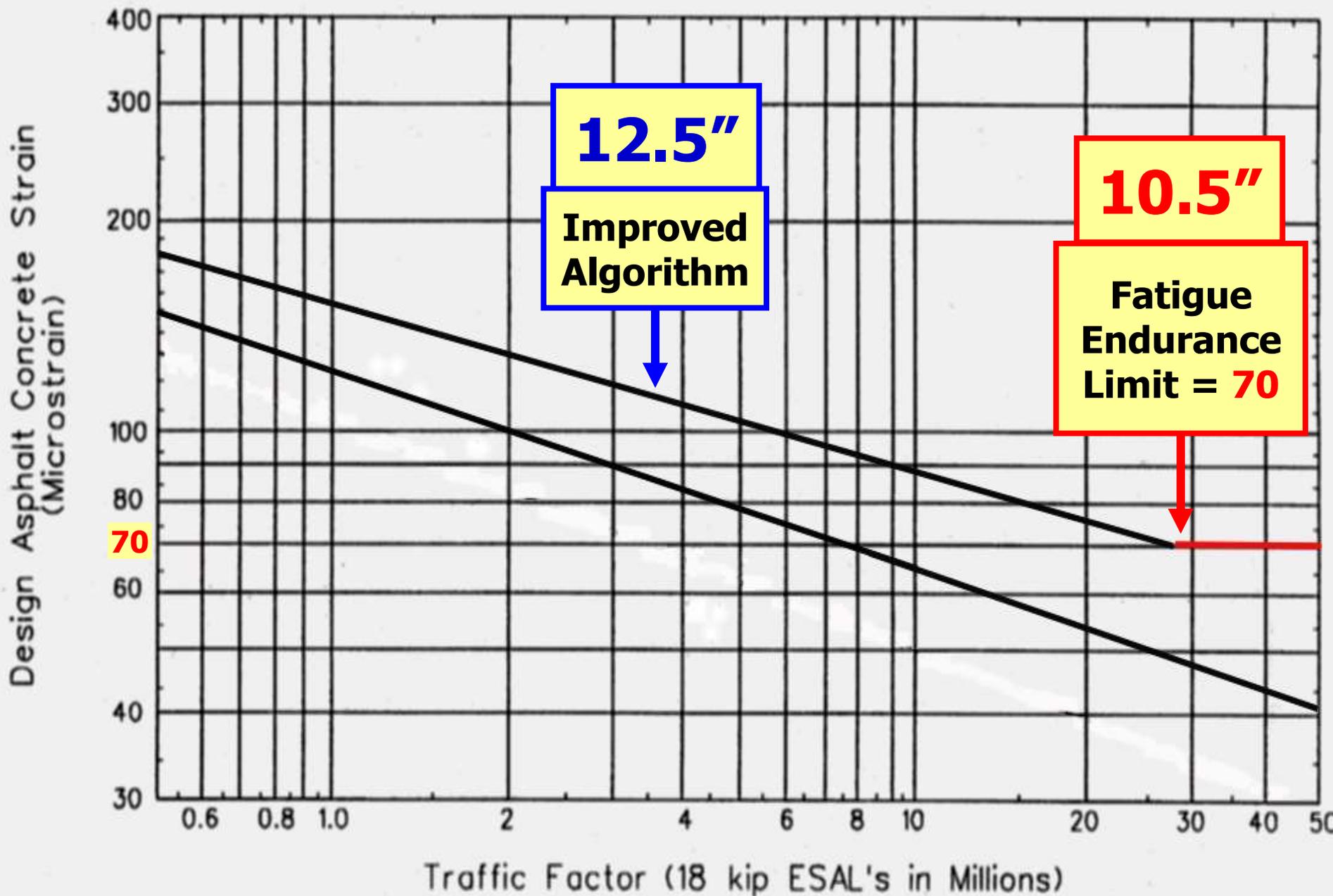
More loads, thicker pavement

Realistic HMA Fatigue

High Strain = Short Life

Low Strain = Unlimited Life





What Have We Learned That Should Improve Durability?

- Field VMA
- Lots About RAP:
 - IDOT's RAP "Gsb" value
 - Processing and Fractionating
- Longitudinal Joint Density



The Next Project...

- HMA Pavements **can** handle the traffic
- What will the next design look like?
 - Thickness?
 - AC Performance Grade?
 - RAP?
- How much **money** can we save?
 - Reduced Thickness
 - Improved Performance
- **There IS an alternative to “Brand X”!**

Thank You!

- IDOT and FHWA
 - Allowed the project
 - Partnered with us
- Howell and Champaign Asphalt
 - Put forth the extra effort
- Marshall Thompson, Sam Carpenter & the U of I
 - Constantly supporting IDOT & our Industry
- Marvin Traylor

QUESTIONS?

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