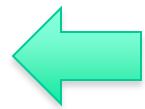
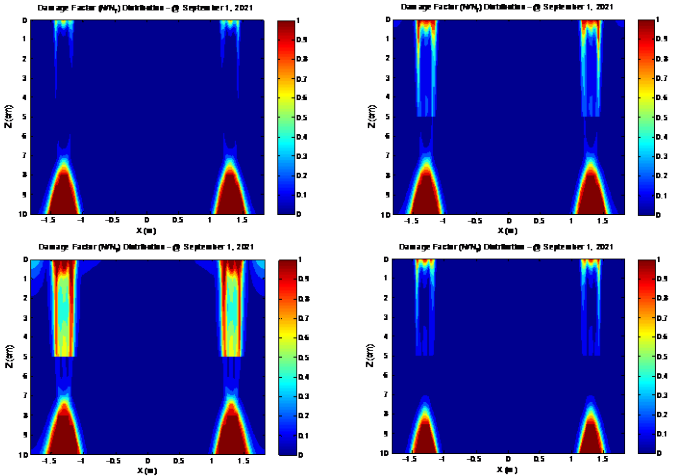
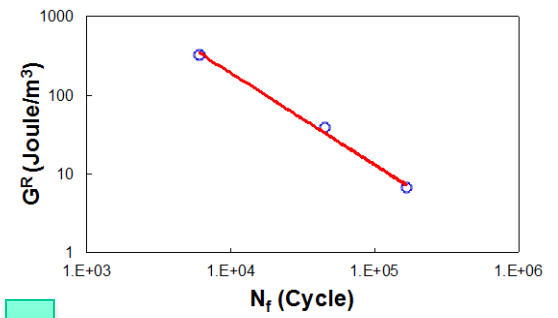
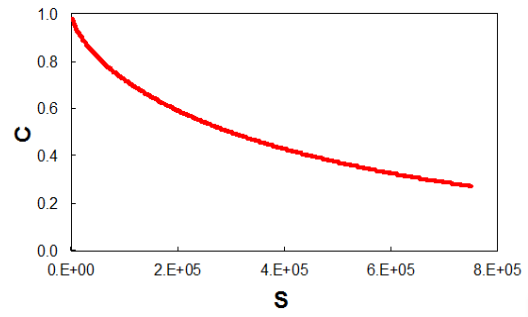
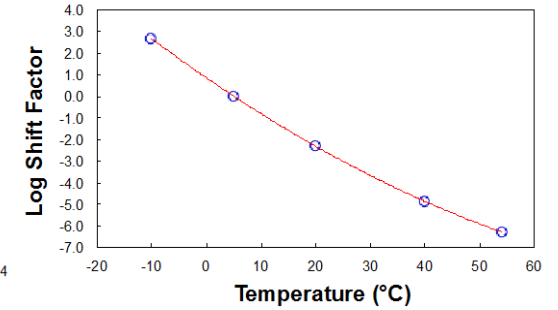
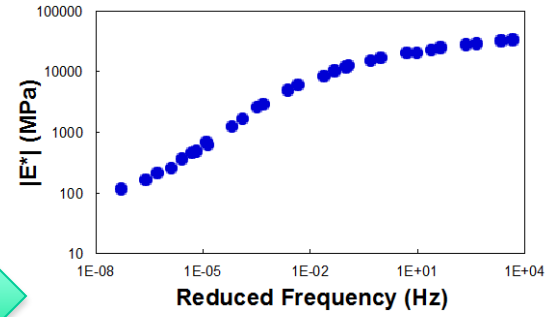
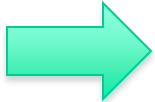


Evaluating Different Ways to Predict Pavement Cracking Performance

NCAT Test Track Pavements (7-inch)

FHWA ALF Pavements (4-inch)

S-VECD/LVECD Prediction



ELL Program

Result Information: Fatigue Cracking Results • Rating Results •

Structure Name: Flexible 2-Layer Pavement

Pavement/Lane Width (ft): 12

Layer Properties:

Layer	AC1	AC2	Subgrade
Thickness (in)	8	8	Infinite Layer
Material Type	Asphalt Concrete	Asphalt Concrete	mass.
Specific Gravity (pavement)	130	130	2.00022778

Strength/Modulus:

Layer	AC1	AC2	Subgrade
Fatigue	0.2880	0.2880	0.0000
Log (psi)	1.4112e+04	2.6192	0.6400
Ref. Temp (°F)	41	0.0000	0.0000
Shift Factor (a)	2.1487e-04	0.0000	0.0000
Shift Factor (b)	0.1038	0.0000	0.0000
Shift Factor (c)	2.8934	0.0000	0.0000

Rating:

Layer	AC1	AC2	Subgrade
Rating	15.6822	0.0286	14.8513
Rating	0.0094	0.0000	0.0000
Rating	129.2000	0.0000	1.2894

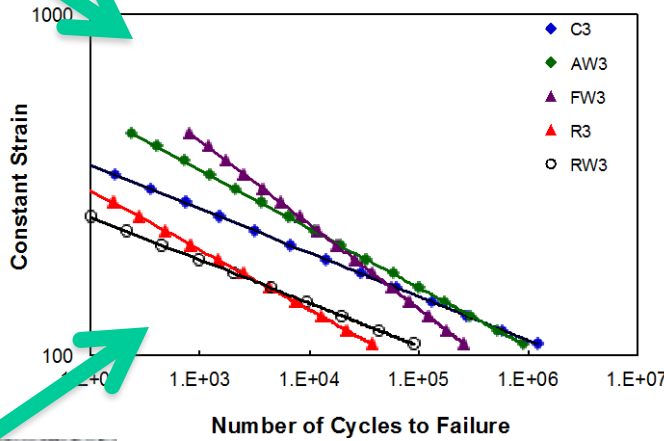
Math Factor: $\log(a_1) = a_1 T + a_2$, Rating Model: $a_1 = \frac{A \cdot B \cdot N}{C \cdot T^D}$

Power Series: $S = E_{max} \sum_{i=1}^n R_i a_i^{-1}$, $\Delta S_{max} = \Delta S_{max} \cdot 10^{i-1}$

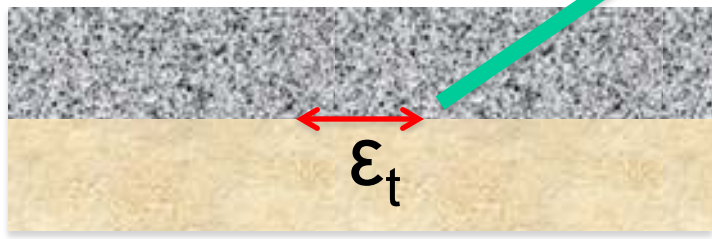
Fatigue Model: $\frac{da}{dN} = \frac{C_1}{C_2} \left(\frac{K_1}{K_2} \right)^{m_1} K_2^{-m_2} K_3^{-m_3} K_4^{-m_4} K_5^{-m_5} K_6^{-m_6} K_7^{-m_7} K_8^{-m_8} K_9^{-m_9} K_{10}^{-m_{10}}$

Errors and Warnings:

Constant Stress/Strain Based Prediction

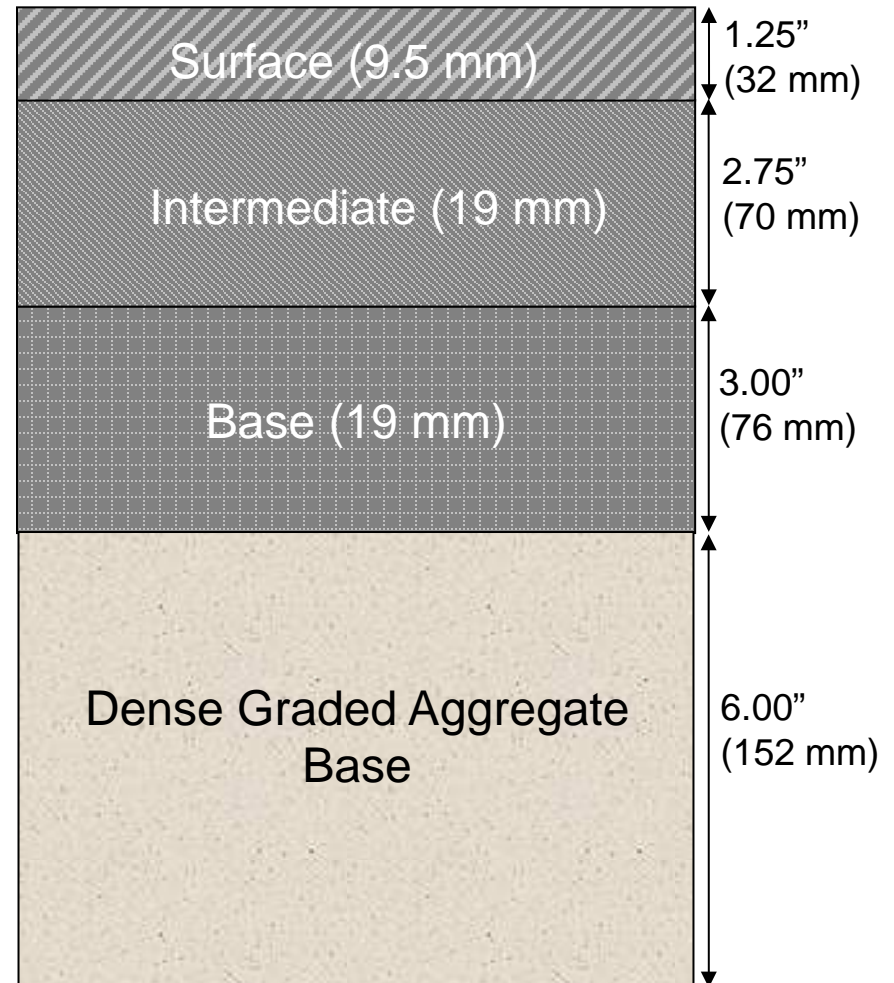


Number of Cycles to Failure



NCAT Mixtures & Test Sections

Mixtures	Label
Control	C
OGFC	O
High RAP	R
RAP+WMA	RW
Foam WMA	FW
Evotherm WMA	AW

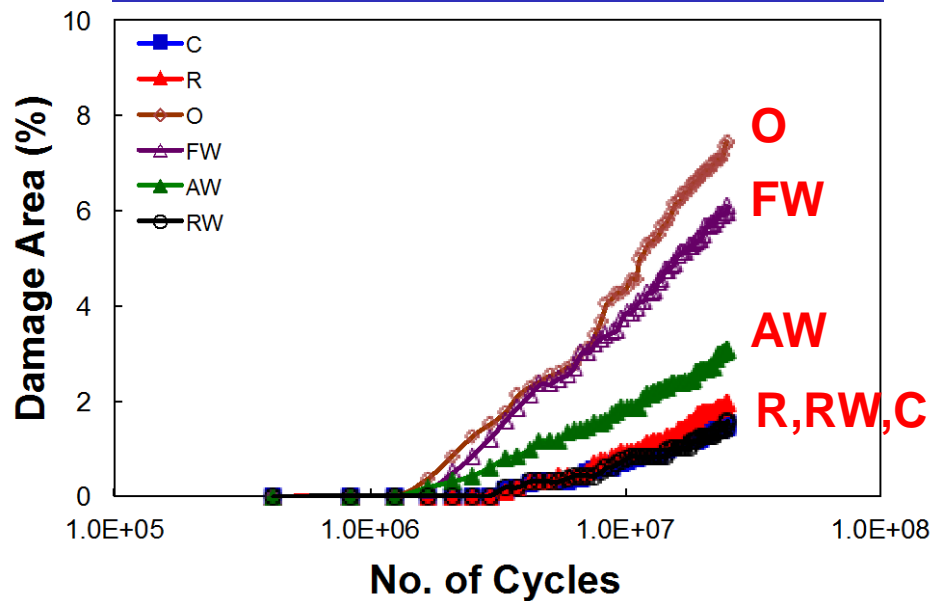


Stiff Subgrade

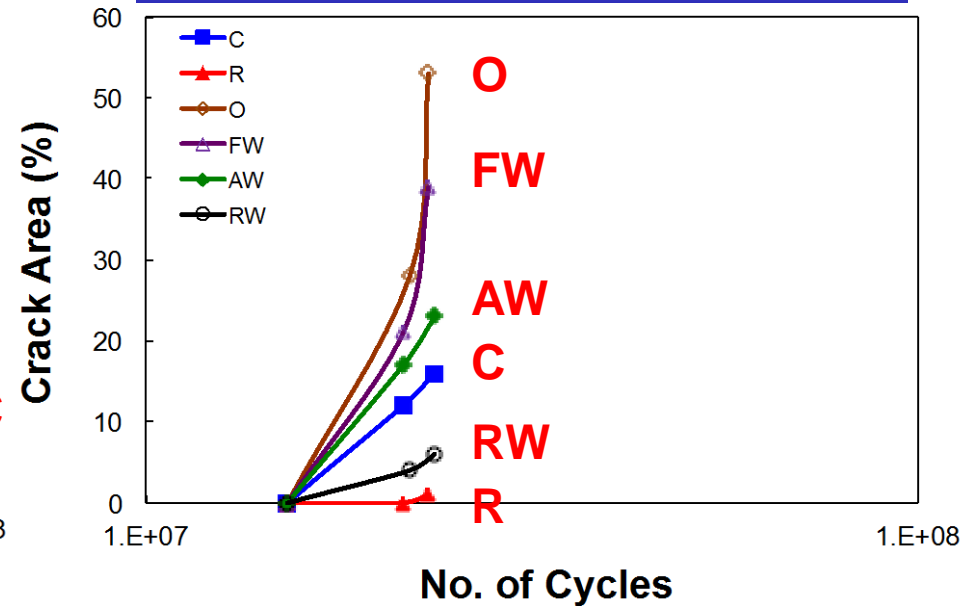
Laboratory-to-Field Correlation

NCAT Sections

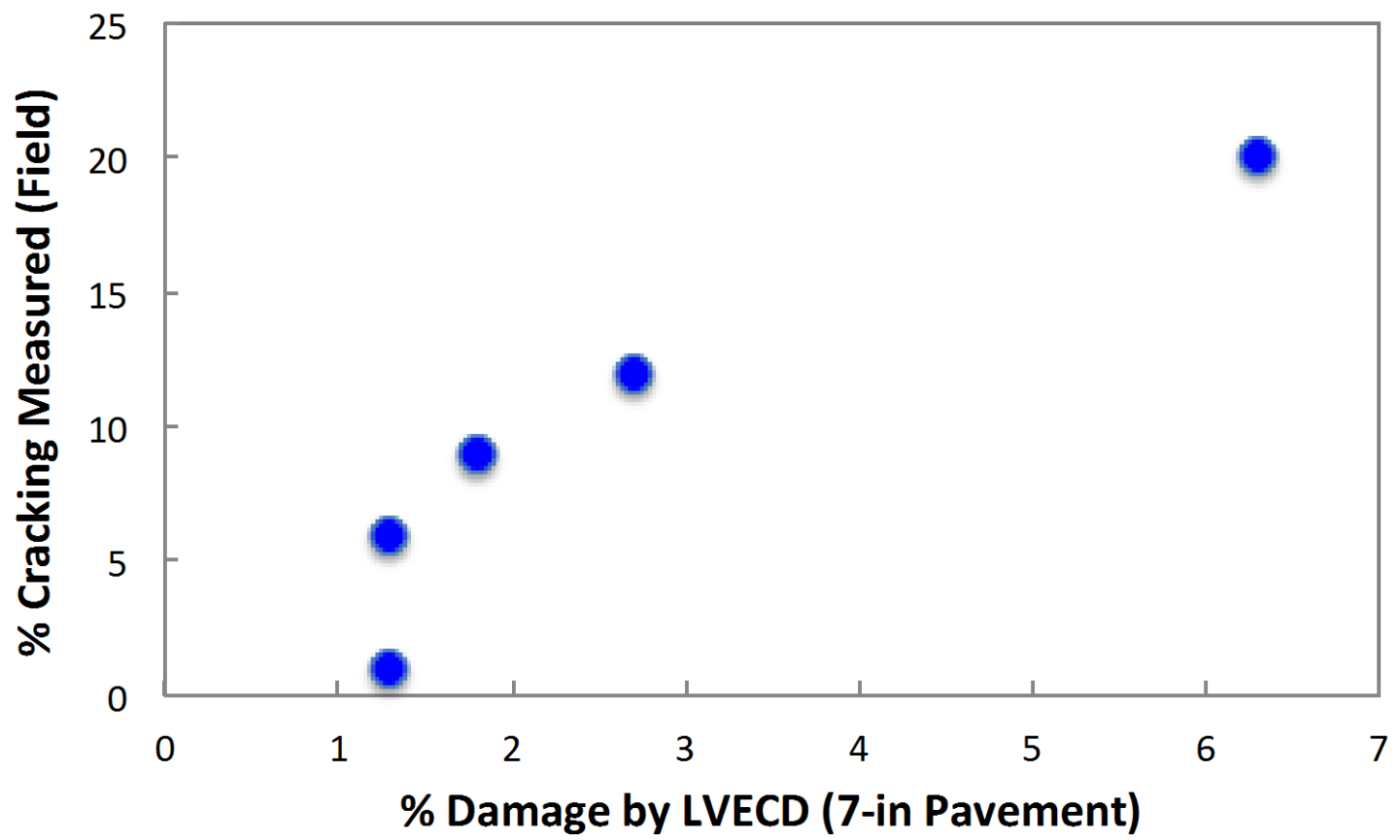
LVECD Analysis



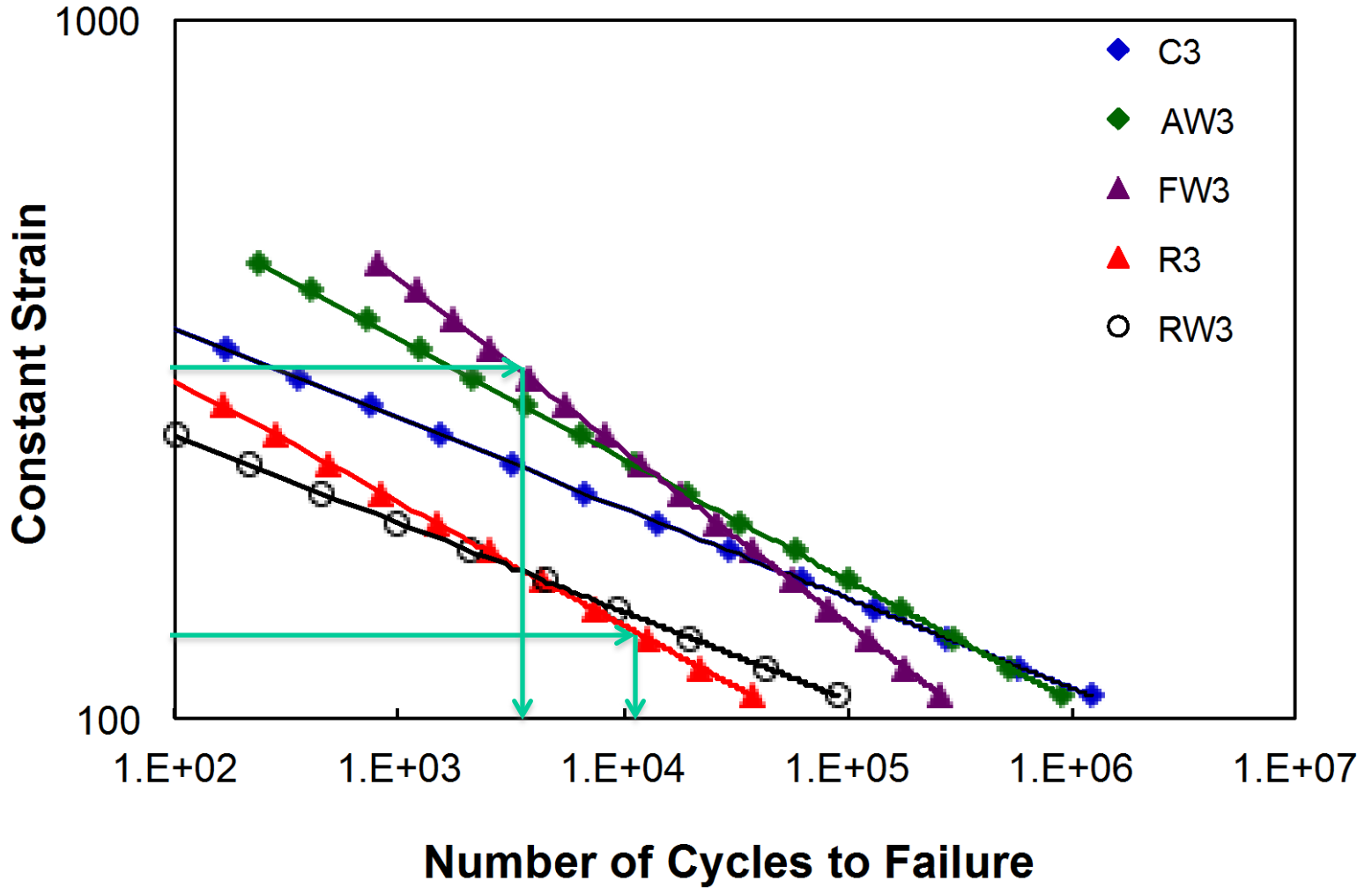
Field Cracking Data



LVECD Predictions of NCAT Pavements

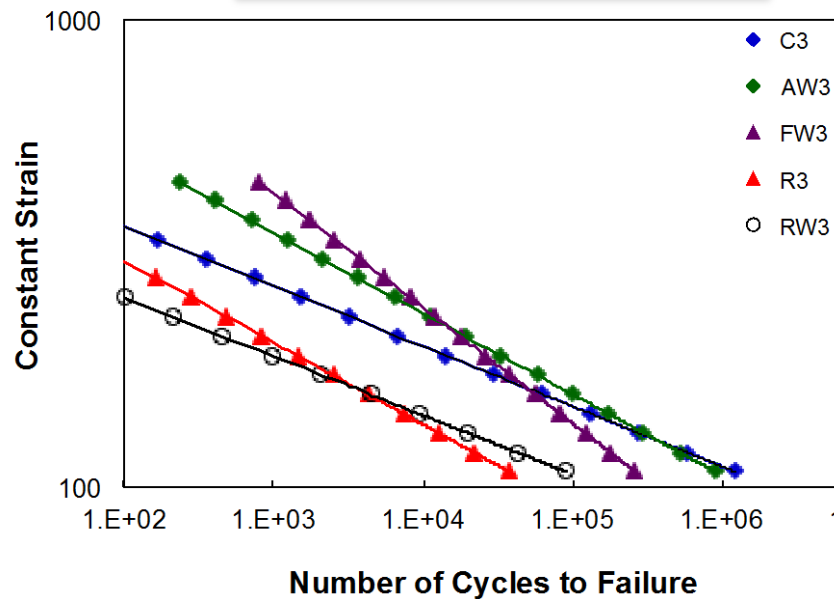


Using Controlled-Strain Mode

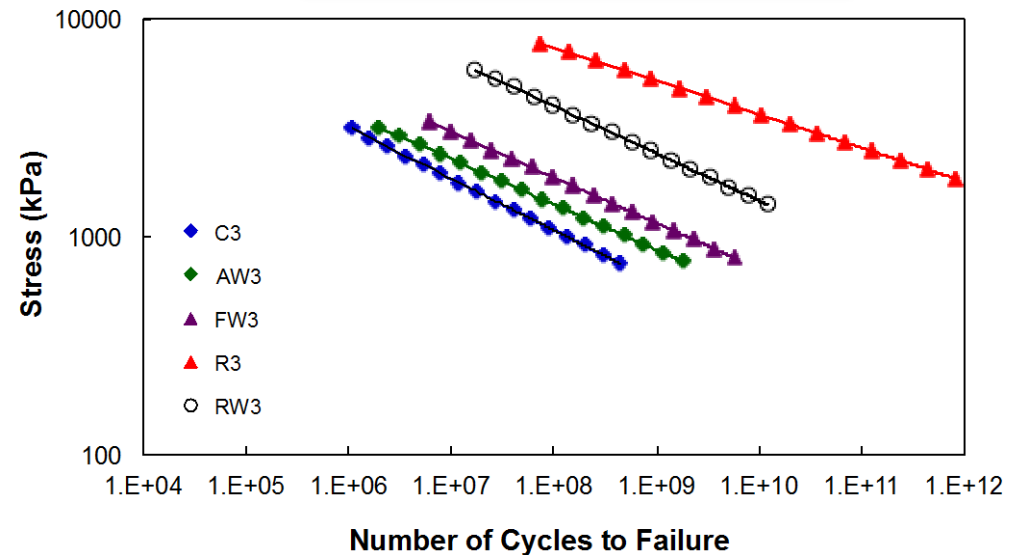


Using Different Modes of Loading

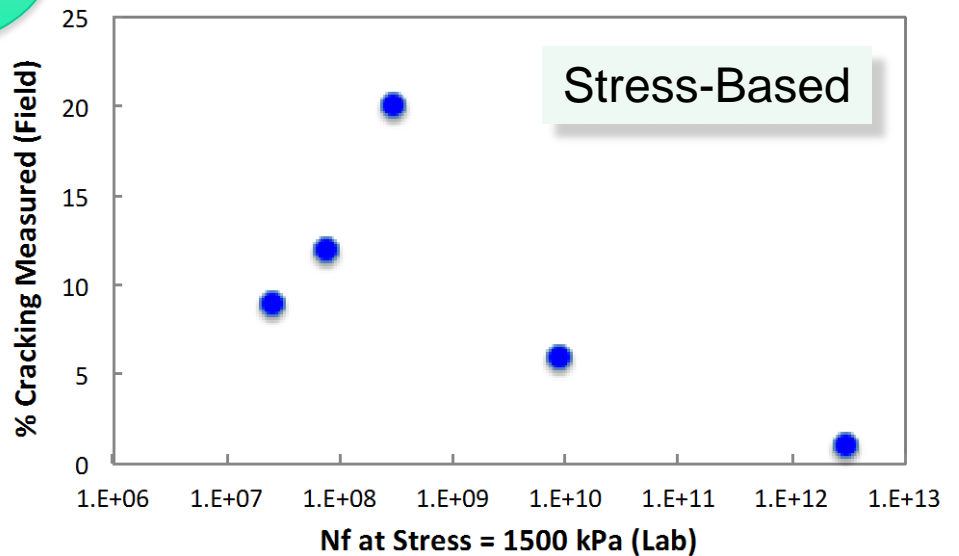
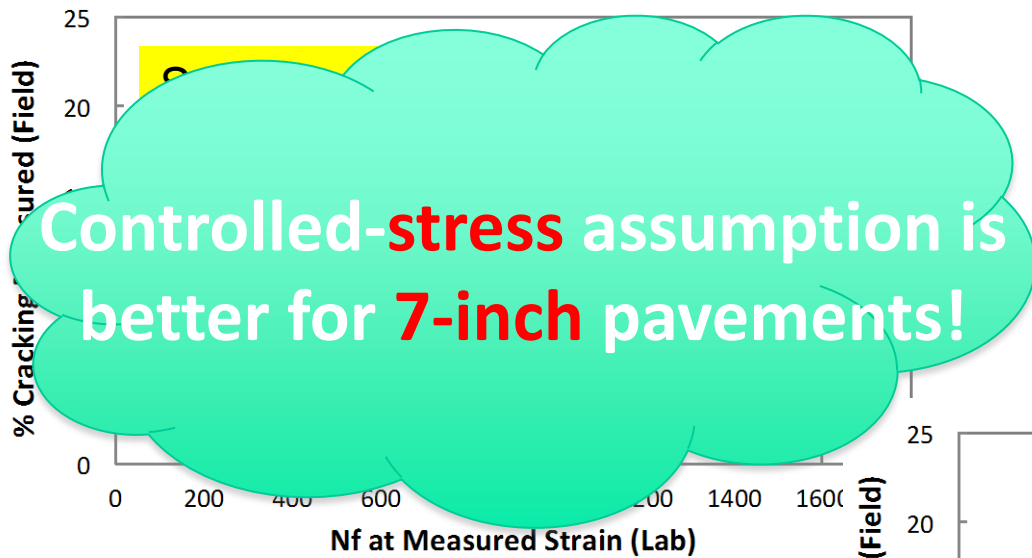
Controlled-Strain Mode



Controlled-Stress Mode



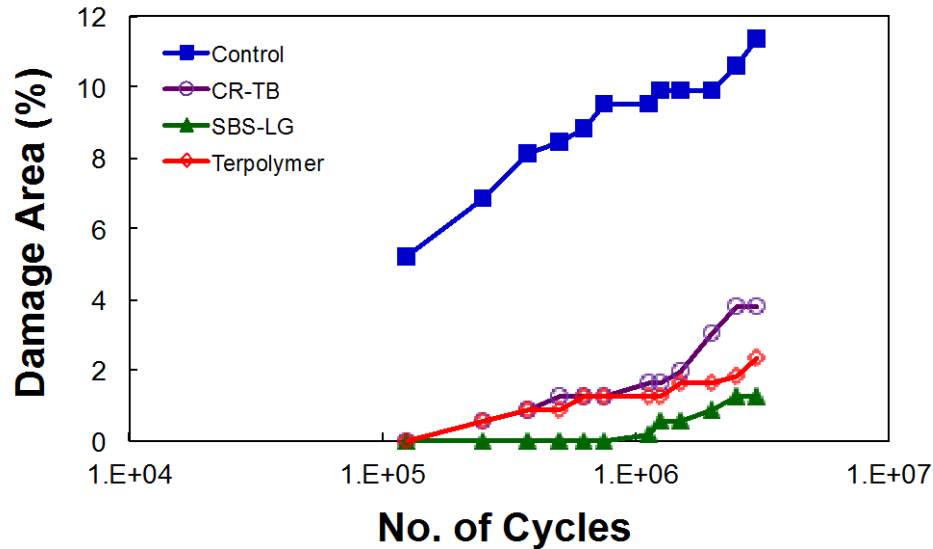
S-VECD Predictions on NCAT Pavements (7-inch)



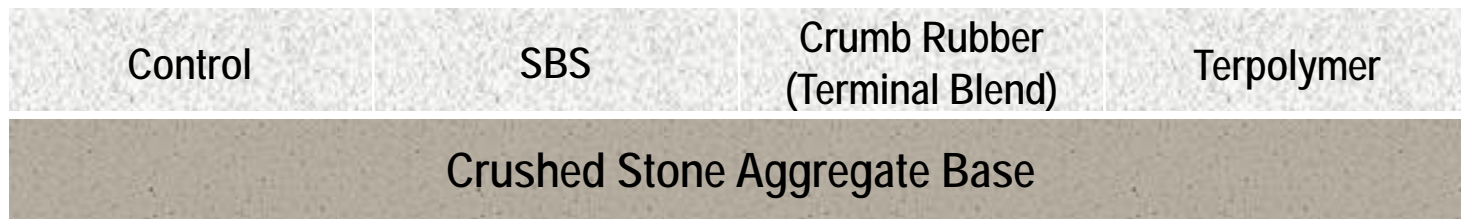
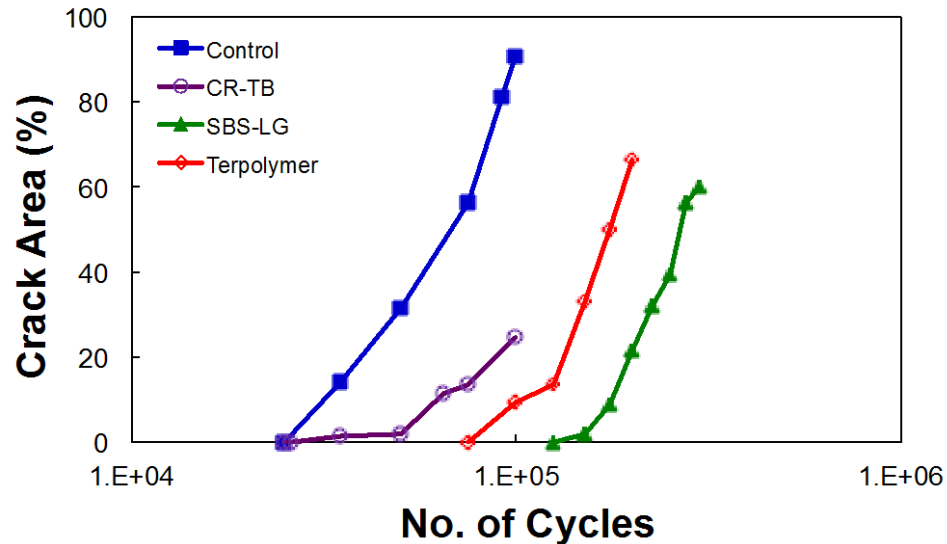
Laboratory-to-Field Correlation

FHWA-ALF (100 mm Pavement)

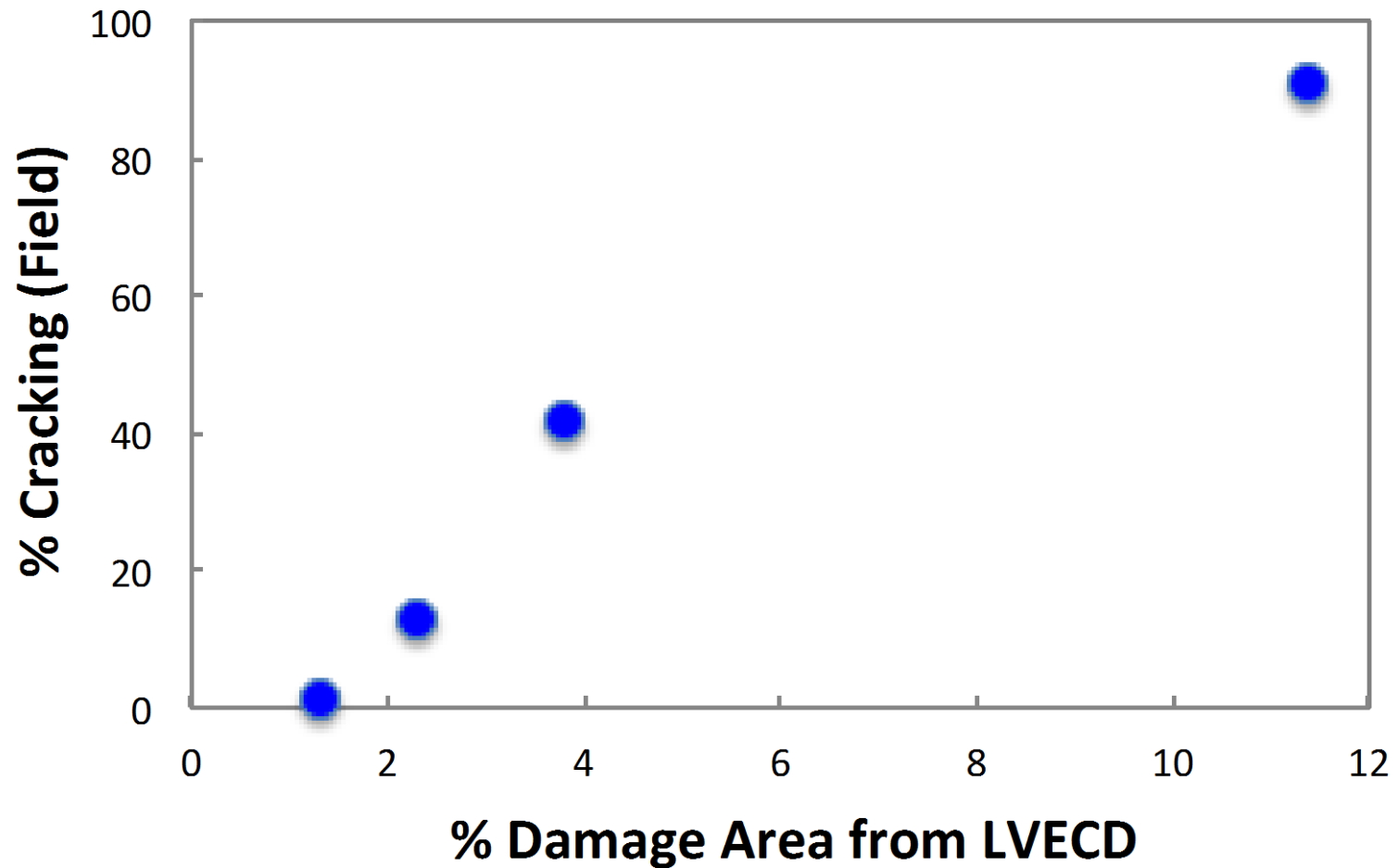
LVECD Analysis



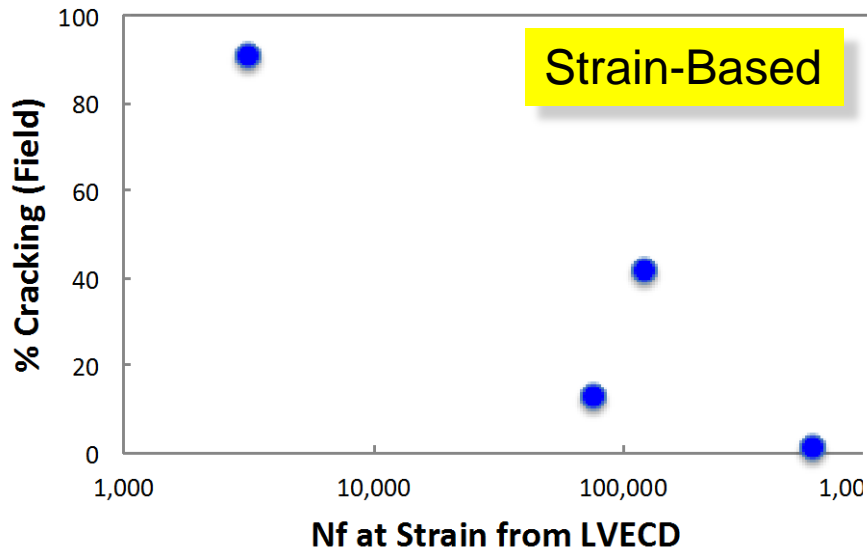
Field Cracking Data



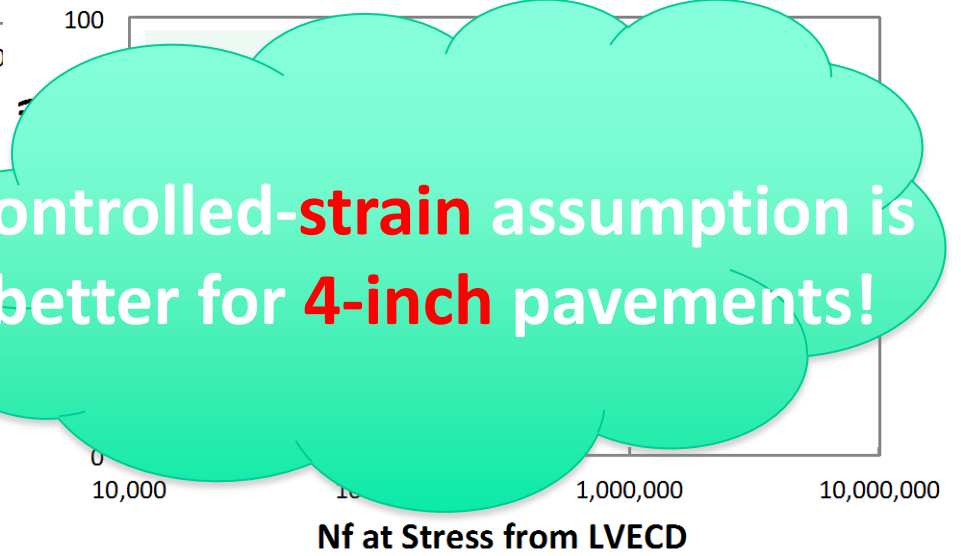
LVECD Predictions of ALF Pavements



S-VECD Predictions on ALF Pavements (4-inch)

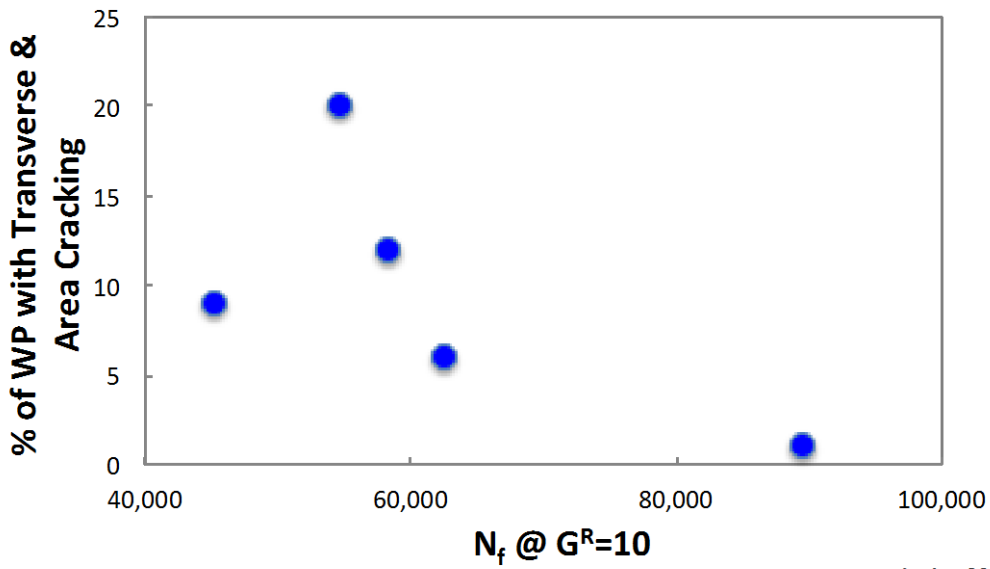


Controlled-**strain** assumption is better for **4-inch** pavements!

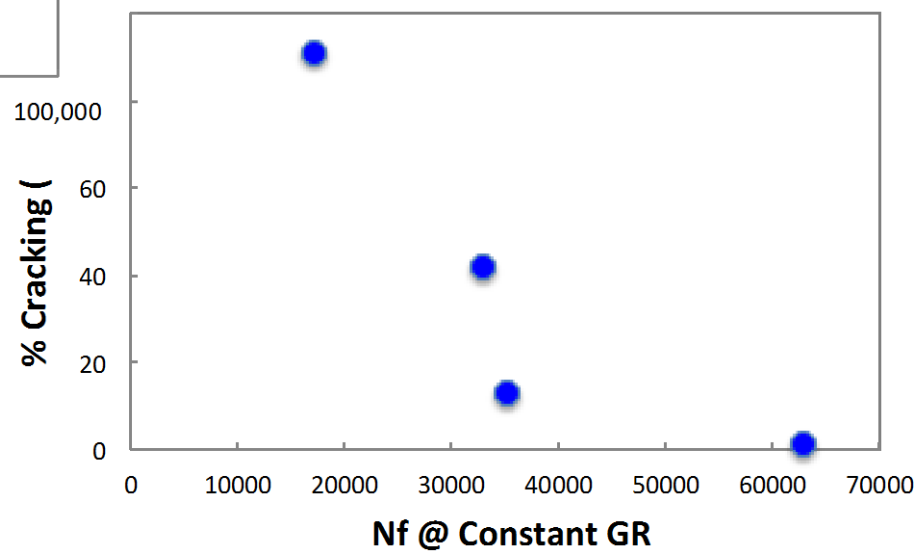


Ranking based on Energy (G^R)

NCAT Pavements



ALF Pavements



LVECD Predictions

