NCSC Results of SPT Testing

Becky McDaniel and Lee Gallivan

Regional Effort

- Funded by FHWA
- Five Superpave mixes, one Marshall mix
  - Iowa, Kansas, Michigan, Missouri, Minnesota (SP and M)
  - Also have 2 SMAs (Indiana and Missouri)
  - 2 mixes from Wisconsin (58-28 and 70-28)
- Preliminary data, work is ongoing

Objectives

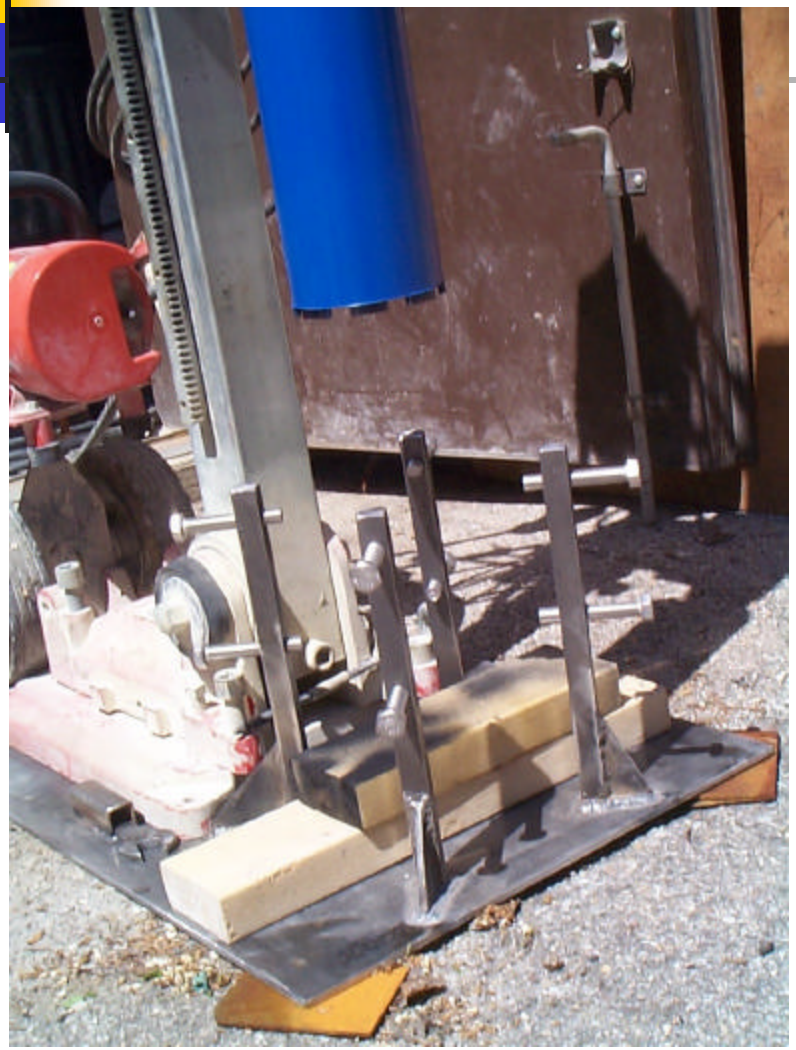
- First look at candidate tests and how typical regional mixes will perform
- Extend to open graded and SMA mixes
- Compare SPT to SST
- Evaluate variety of mix types
- Feedback to FHWA on practical testing issues

Cored Specimen

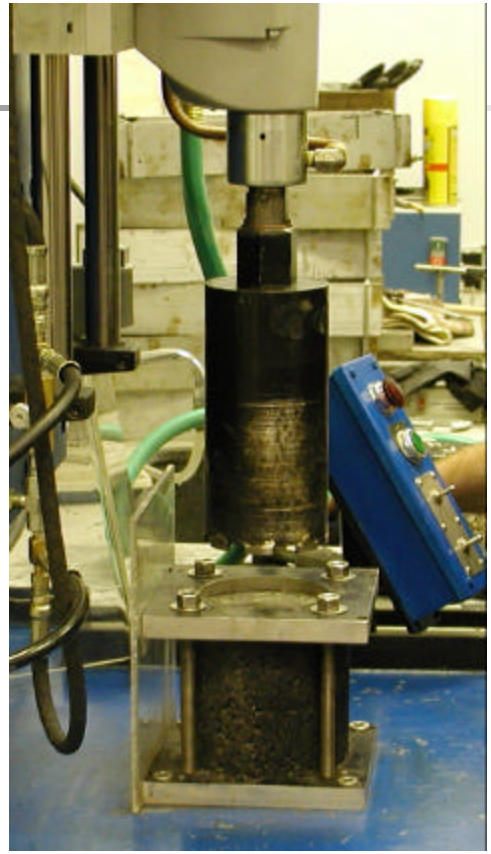
Coring Jig

4.25” nominal diameter bit

Coring Jig



Coring Jig – Asphalt Institute



Triaxial Testing Equipment

Effective Temperatures

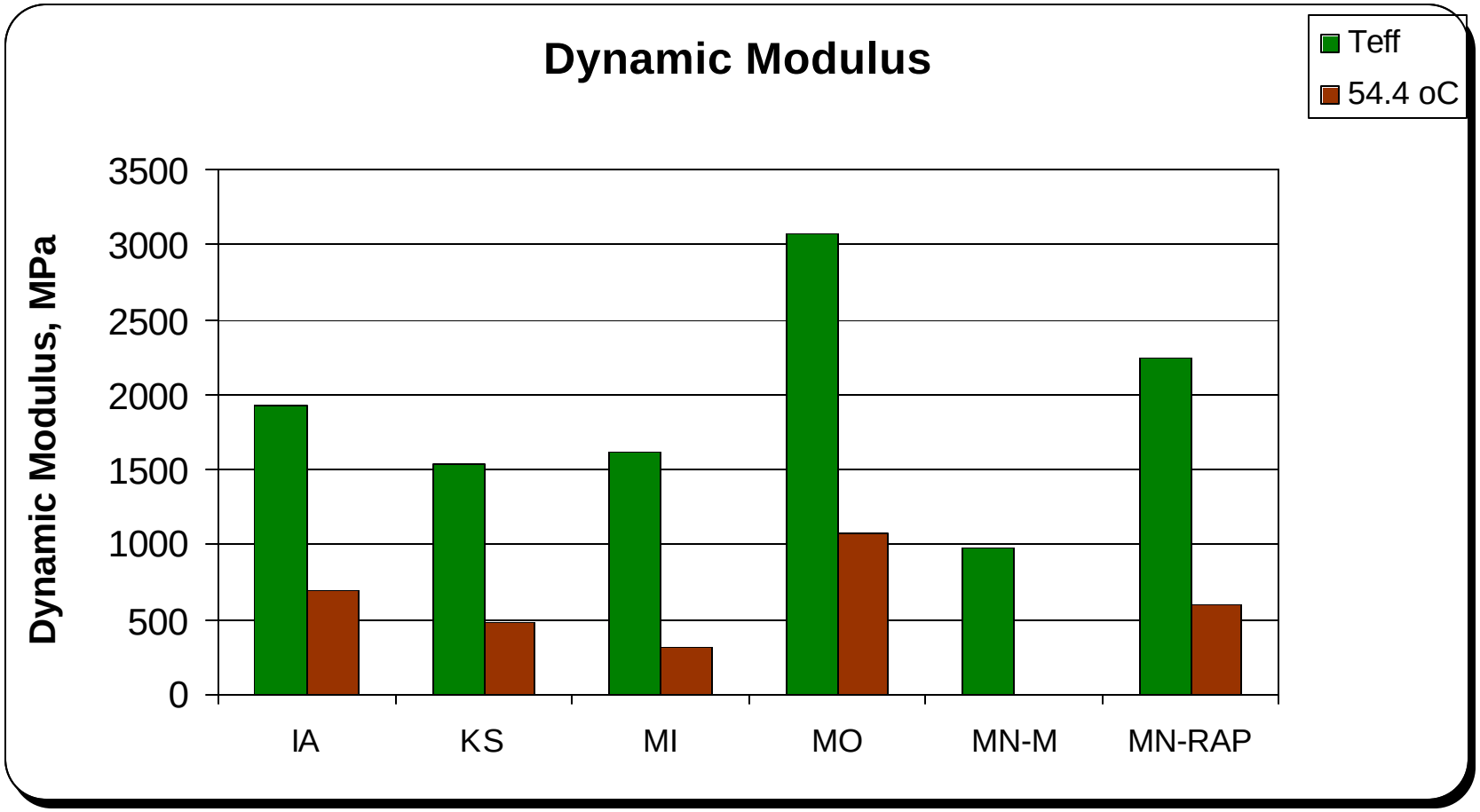
Iowa	39.1	PG64-22
Kansas	40.4	PG64-22
Michigan	34.2	?
Minnesota	36.9	PG64-28 (M) PG64-22 (S)
Missouri	41.1	PG70-22

Also tested all at 54C, reference temperature

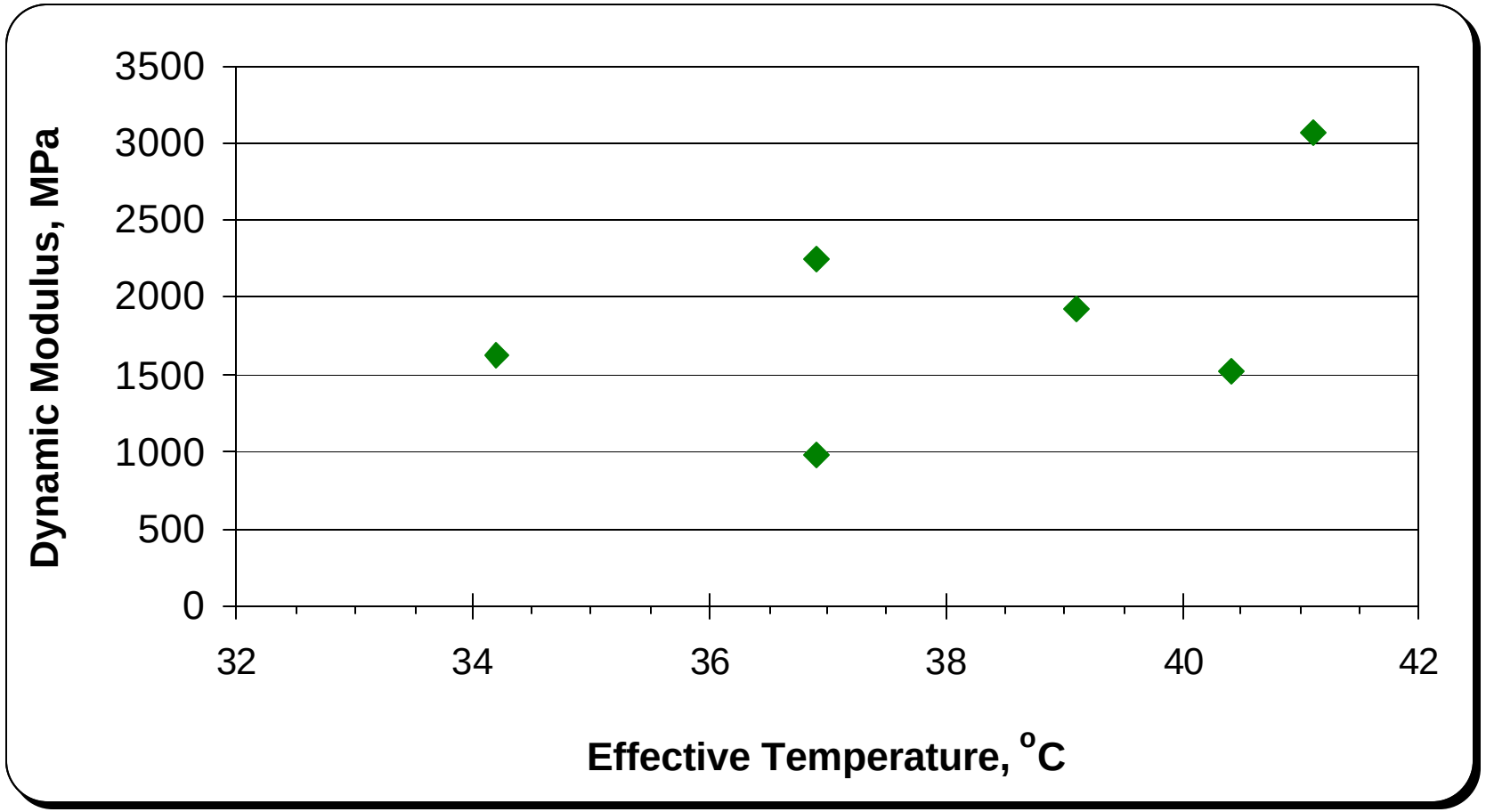
Mix Types/Sizes

Iowa	12.5
Kansas	9.5
Michigan	9.5
Minnesota (M)	¾” minus
Minnesota (RAP – S)	12.5 Fine
Missouri	12.5 Course

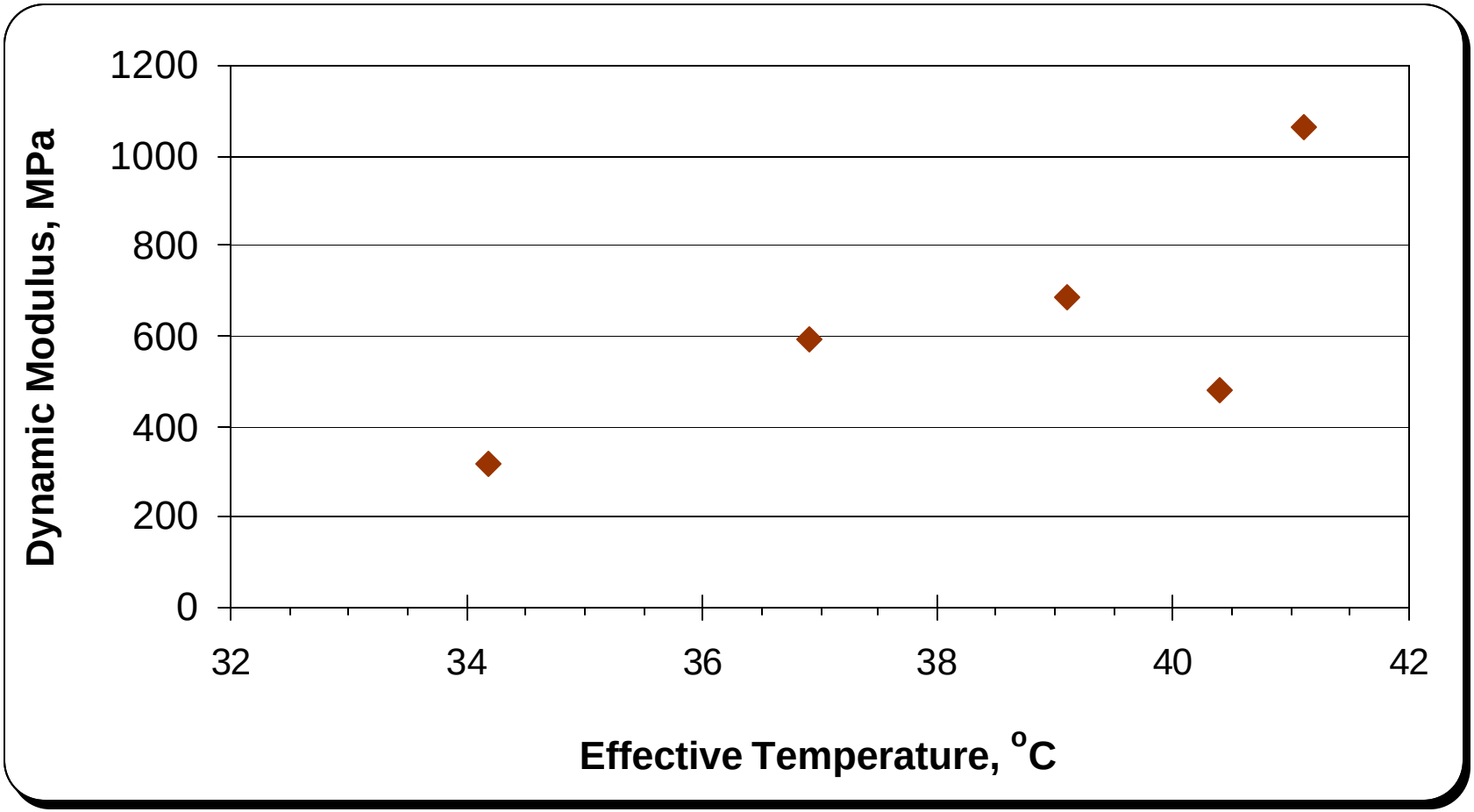
Dynamic Modulus, E*



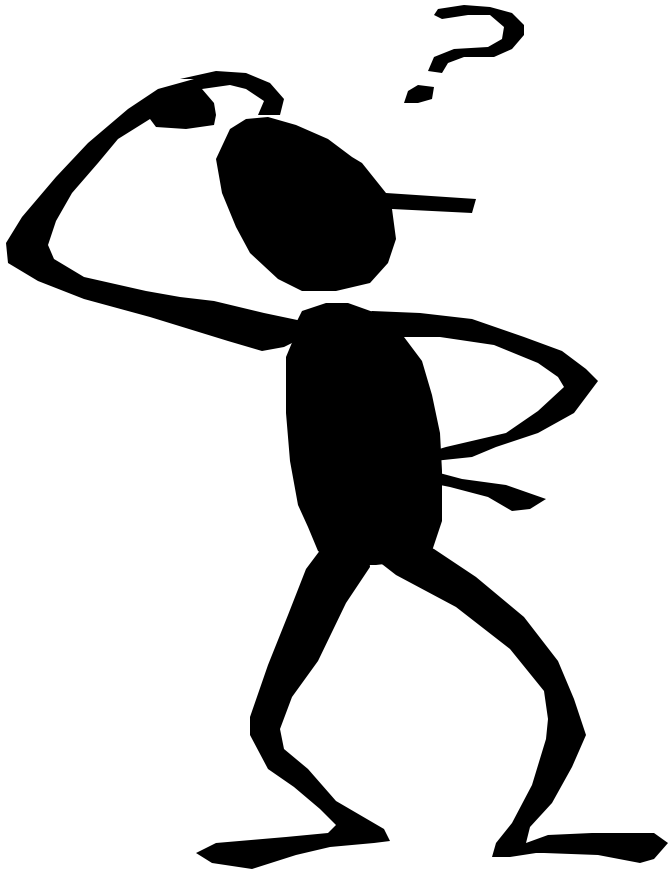
E* vs. Effective Temp



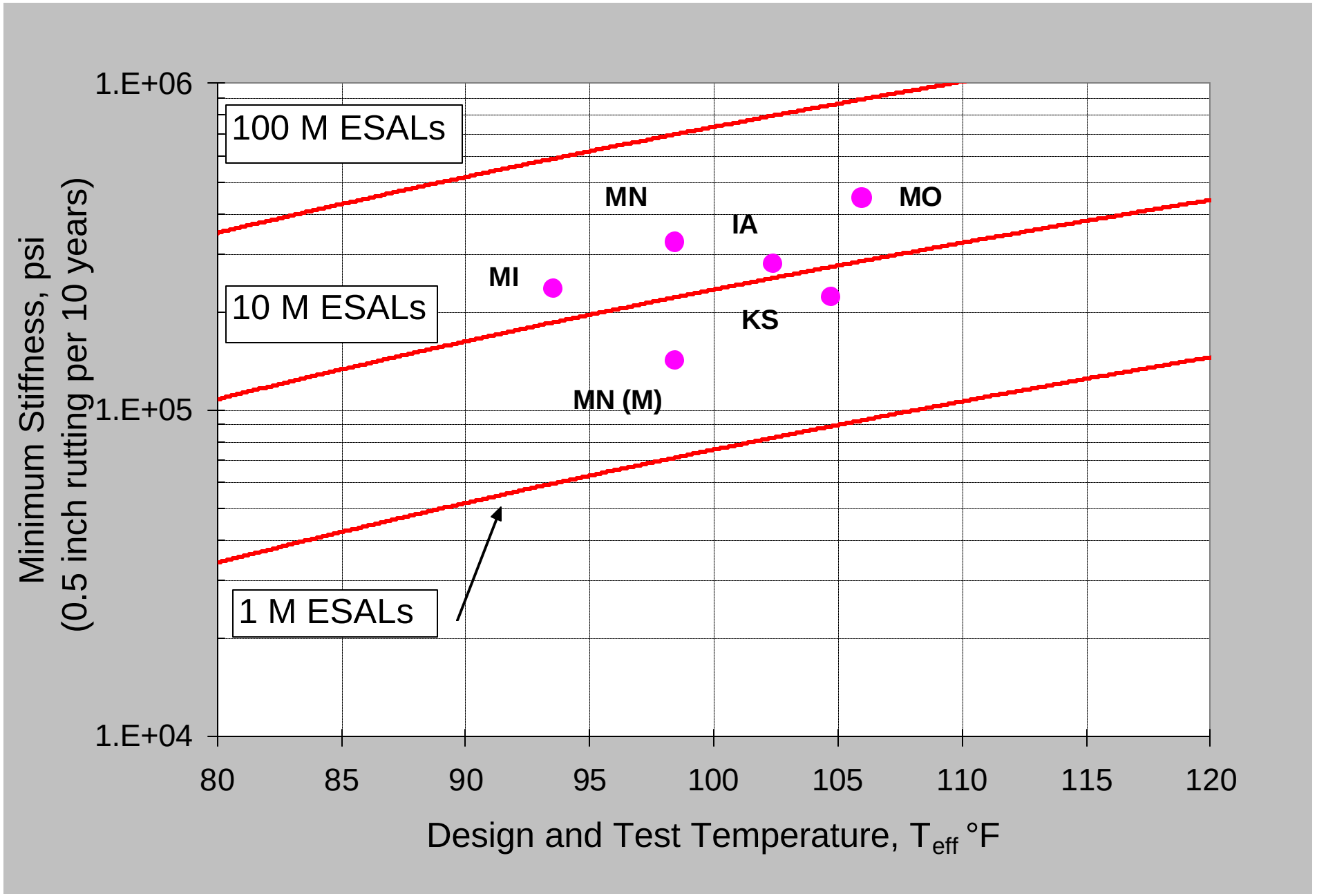
E* Measured at 54C



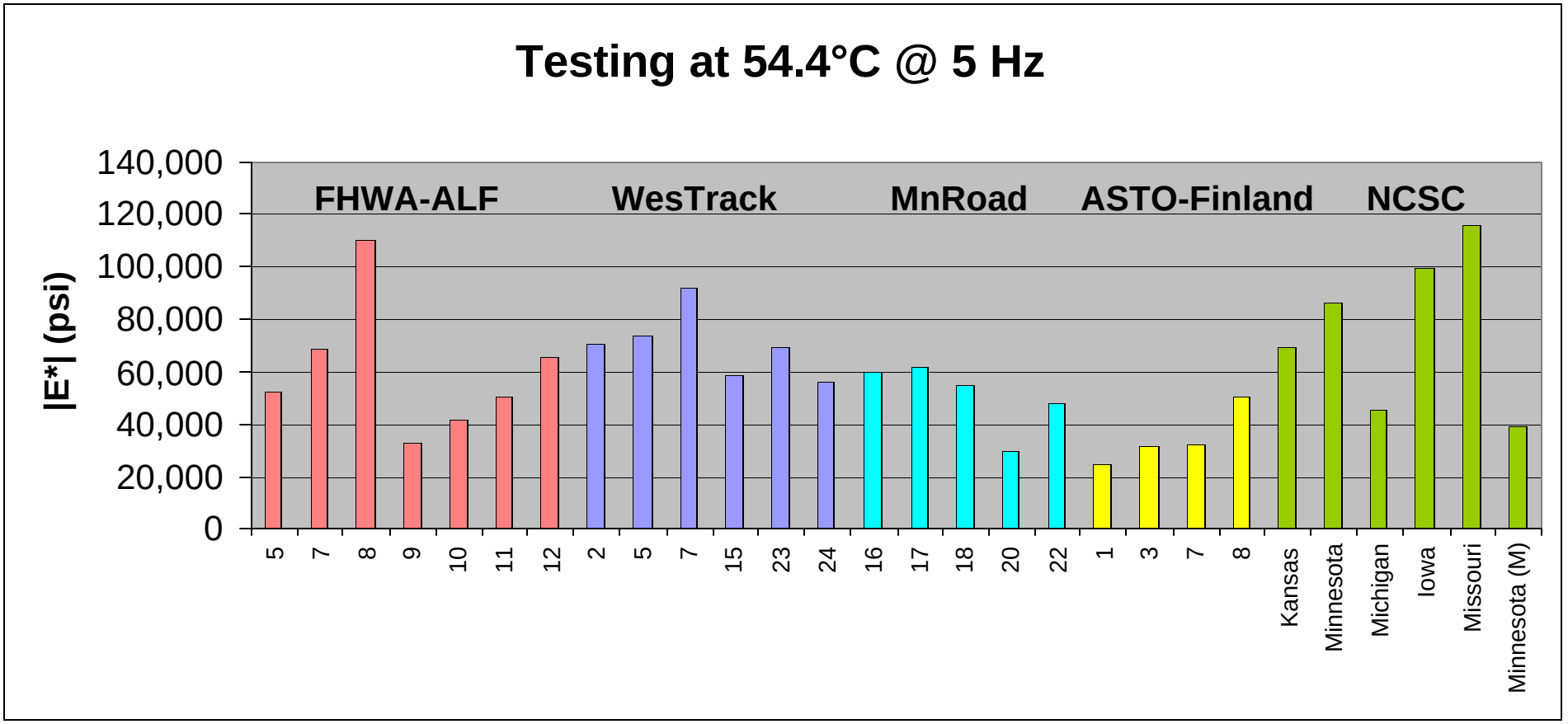
What modulus do you need?



- Preliminary suggestion
- Dr. Terhi Pellinen
- Based on layered elastic analysis, ½” rutting at 10 years
- Not calibrated

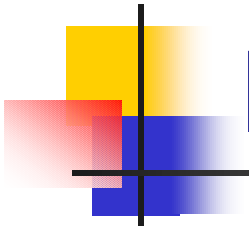

1.E+06
1.E+05
1.E+04
100 M ESALs
10 M ESALs
1 M ESALs
MN
MO
IA
MI
KS
MN (M)
Minimum Stiffness, psi
(0.5 inch rutting per 10 years)
80
85
90
95
100
105
110
115
120
Design and Test Temperature, T_eff °F

Comparison to Other Data



Preliminary Results

- Binder drives stiffness to an extent. Strength test (confined triax) will measure effects of aggregate.
- With lower traffic, you can accept lower stiffness.
- Will look into performance to date.



Plans

- Continue testing
- Continue analysis
  - Performance?
- Complete project this summer

- Need for additional testing or investigation?