

National Superpave Status Present & Future

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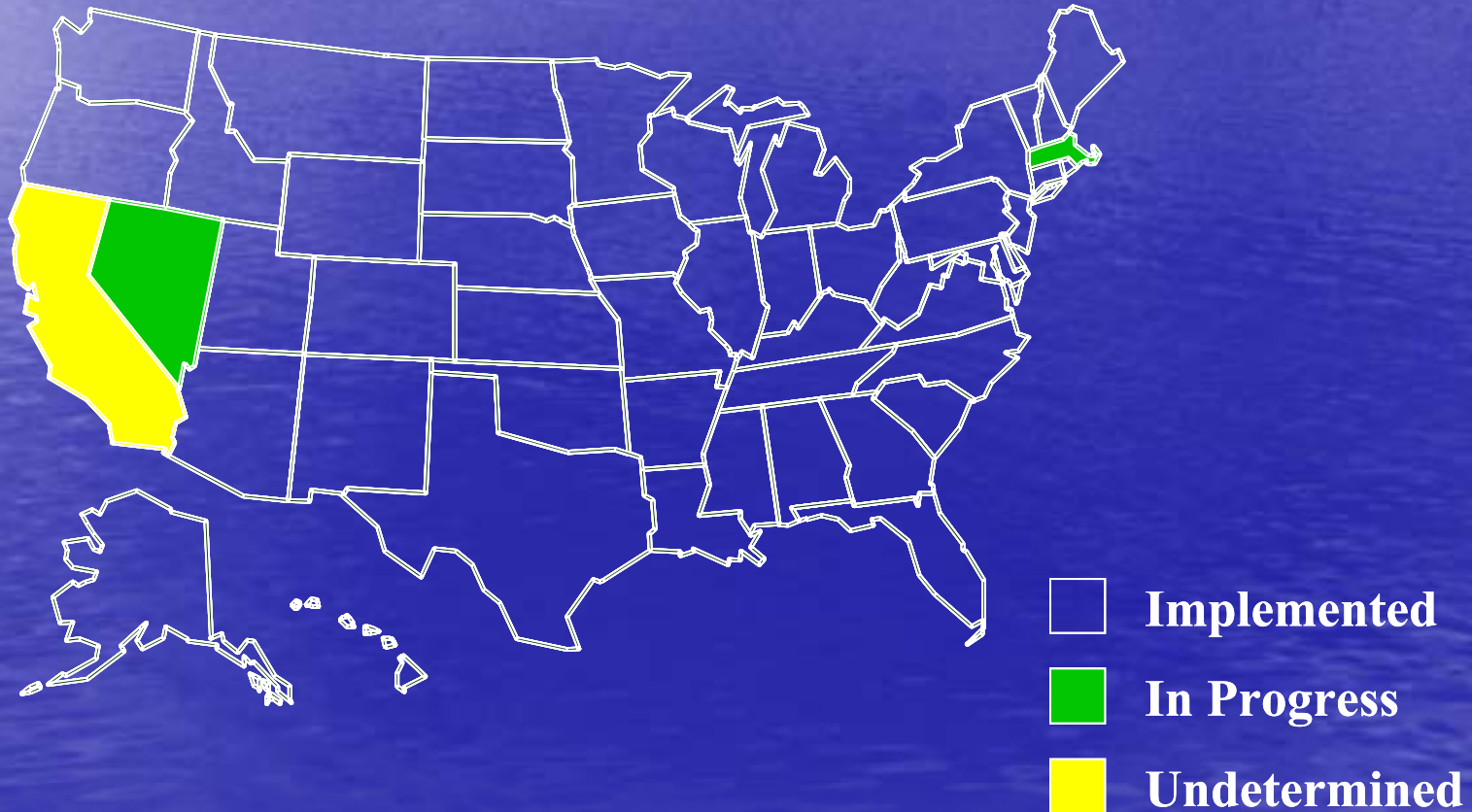
October 23, 2003



**US Department of Transportation
Federal Highway Administration**

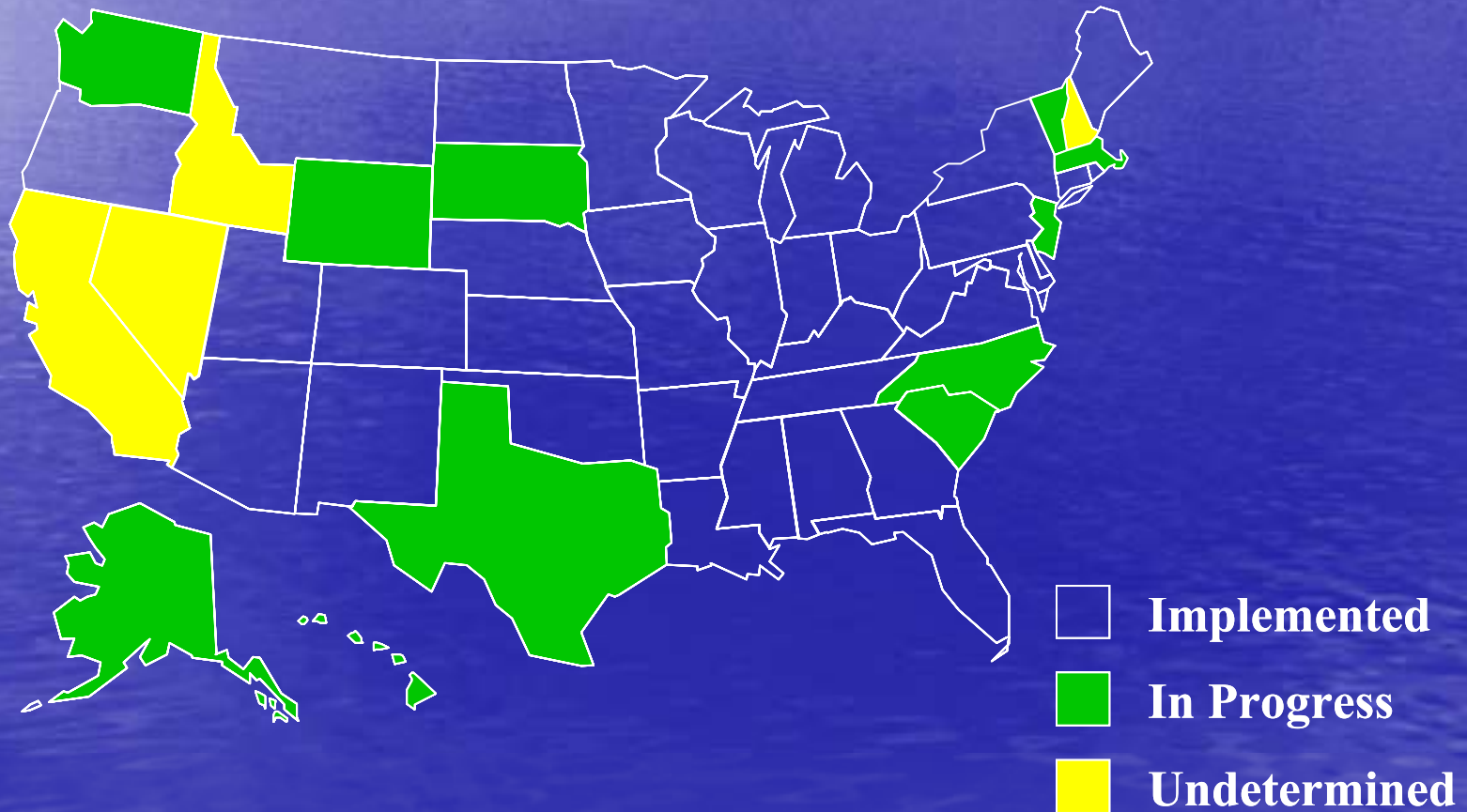
Superpave 2003

- Asphalt Binder Implementation Status

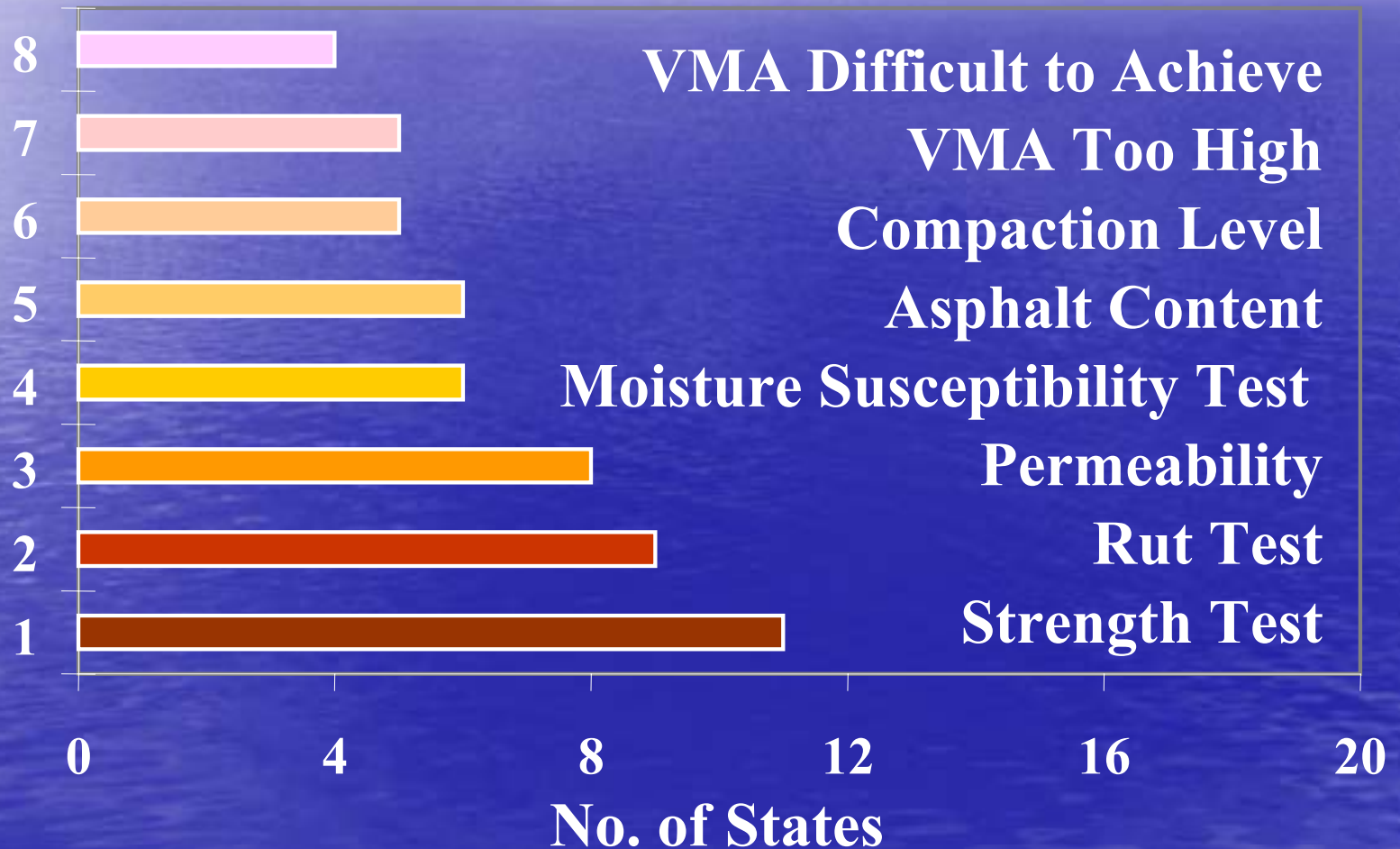


Superpave 2003

- Mix Design Implementation Status

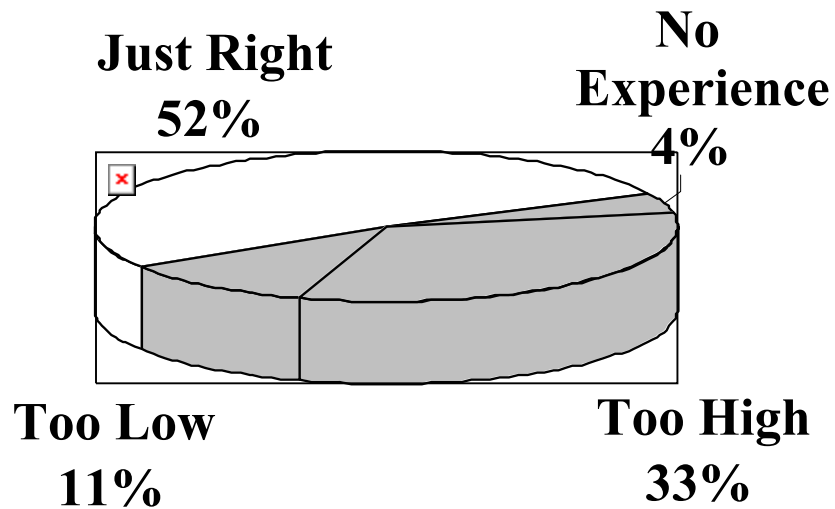


Common Mix Issues



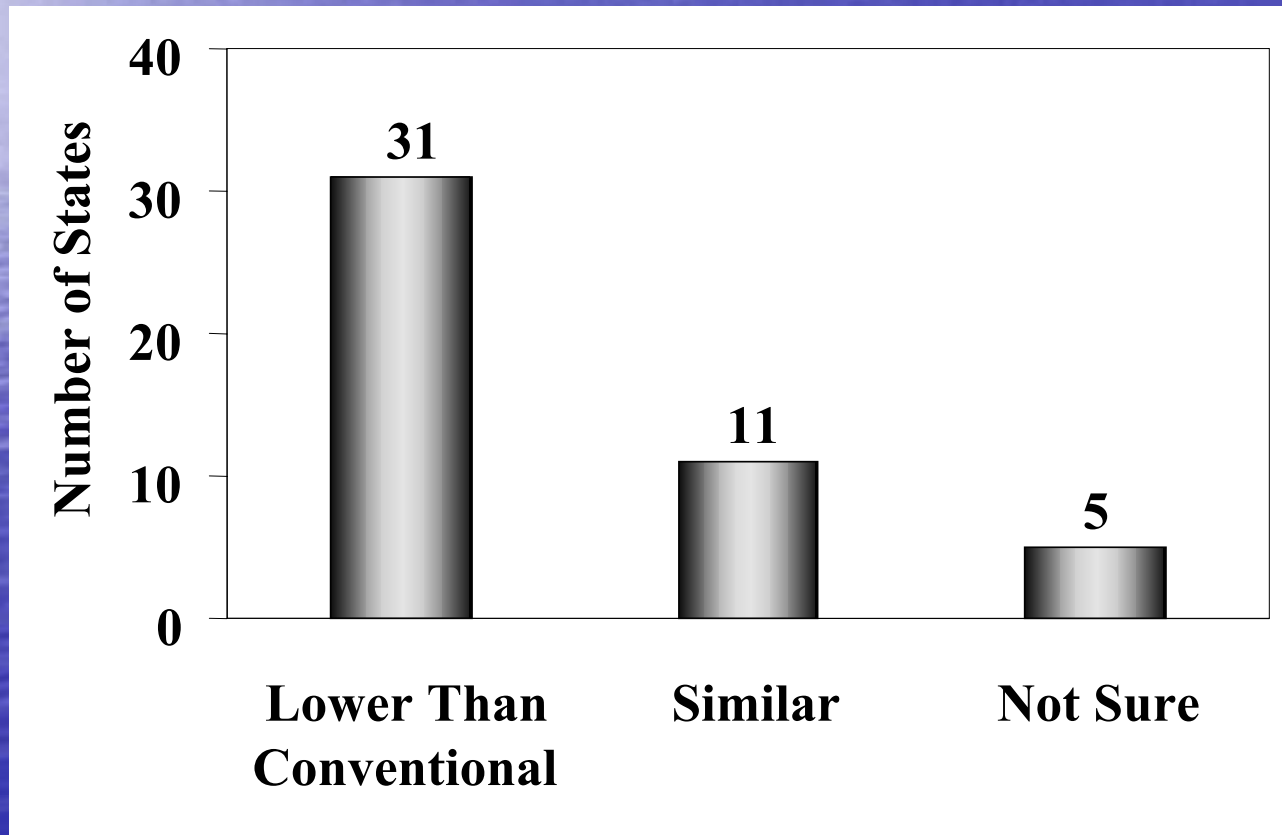
Volumetrics

- Superpave N_{design} Requirements

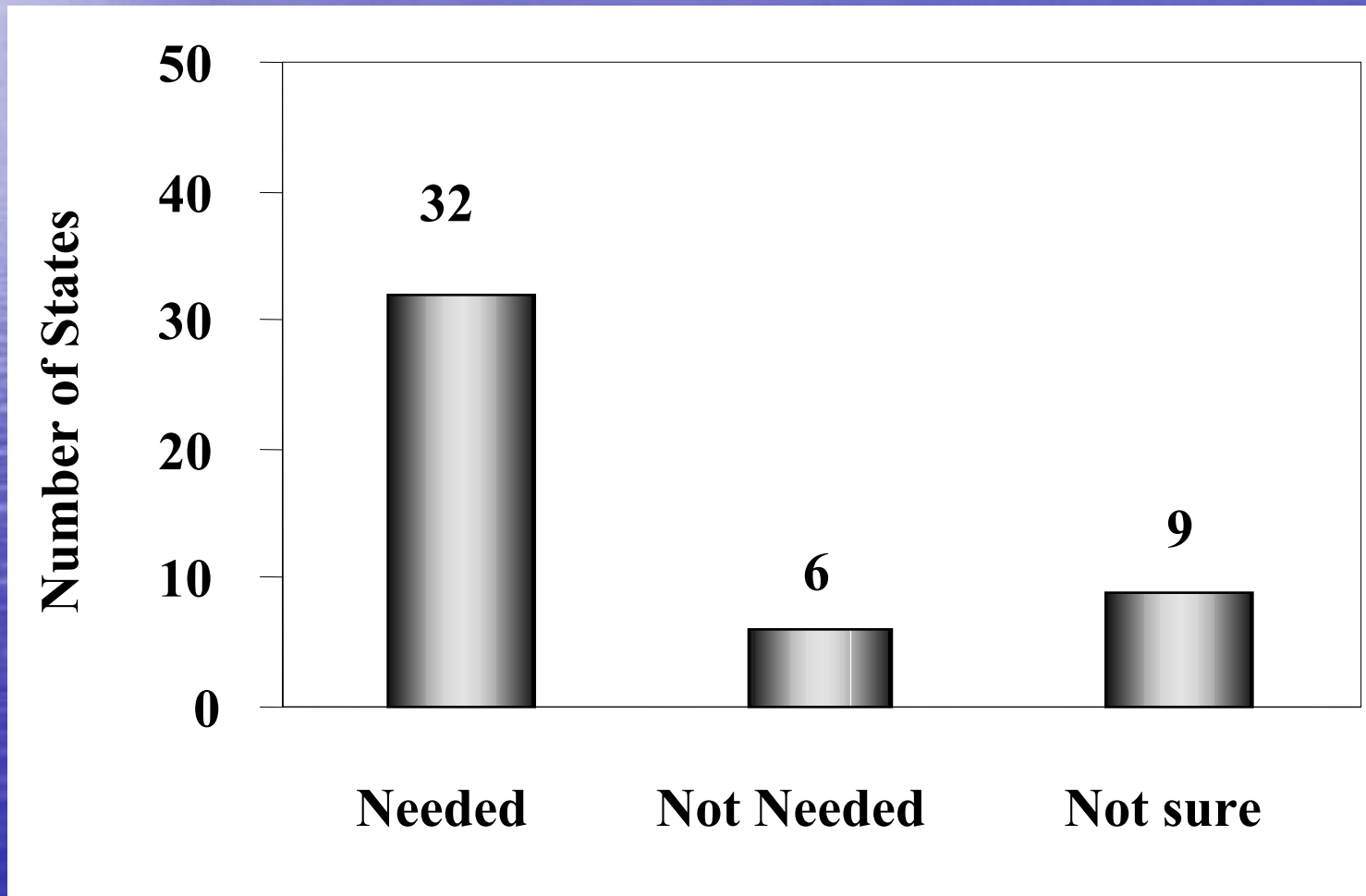


Volumetrics

- Asphalt Content: Superpave vs Conventional Mix

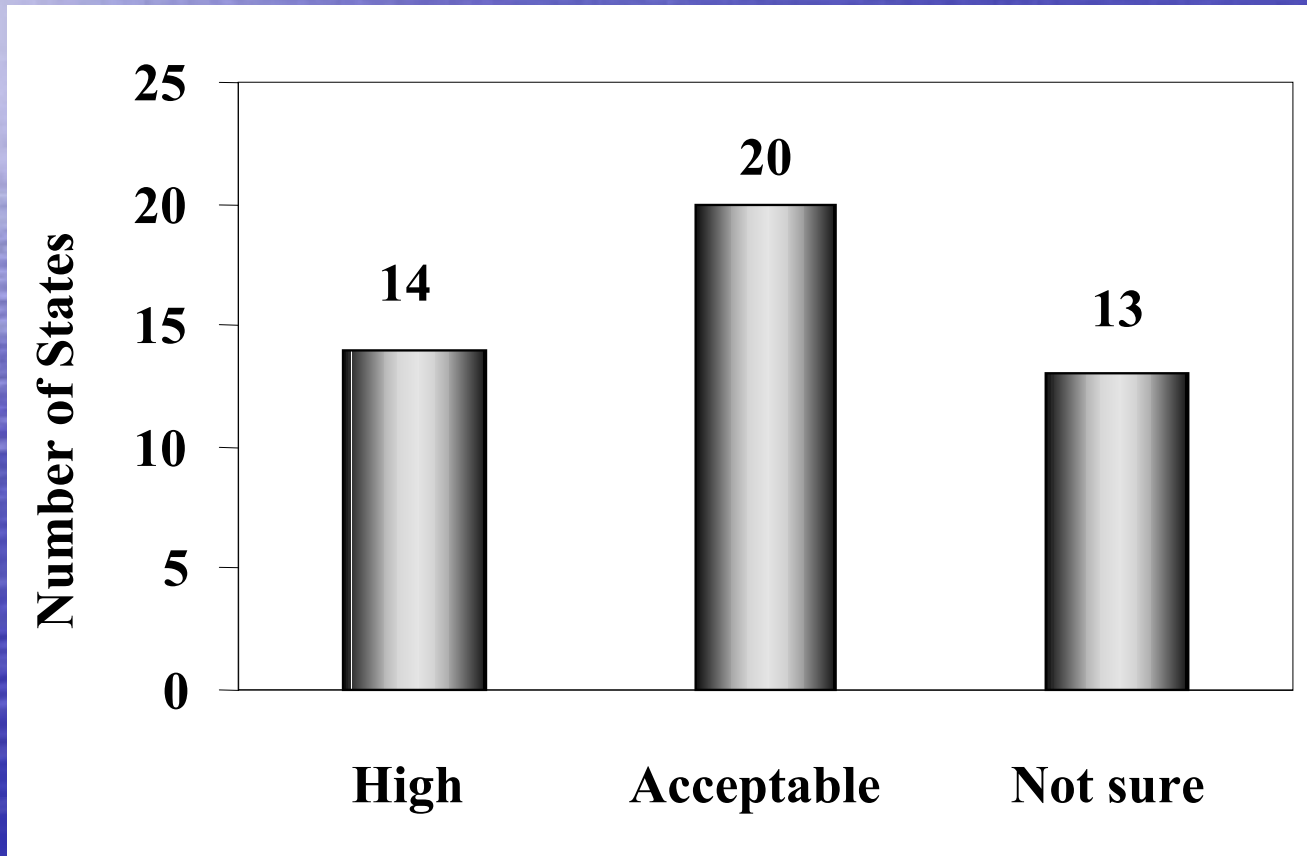


Need for a Accelerated Rut Test



Construction

- Openness of Superpave Mixes



The Superpave System

- Superpave is in place and it does work
- There is a great deal of work needed to fill gaps in the system
- Work is continuing to fill the gaps
- A plan is in place to complete the system by 2005

Superpave Long Range Plan

Goal 1: Mix design completed by 2003

- **Recommended binder type and mixture based on**
 - **Anticipated environment**
 - **Loading conditions**
 - **Layer location**

Superpave Long Range Plan

**Goal 2: Performance predictions available
by 2005**

- Predict the ability of a mix to withstand rutting, fatigue, thermal cracking, and moisture damage through a series of laboratory tests and mechanistic models.

Superpave Long Range Plan

Goal 3: Integrate binder and mix requirements into a performance-based quality control (QC) system during construction by 2005

Superpave Long Range Plan

Goal 4: Superpave to be fully understood

- Public and private-sector engineers
- Technicians
- Contractors

Through continuing training and outreach programs by 2005

Superpave System



- Binder specification
 - Mix design
- Models System

Superpave: Future for Binders

Superpave Plus Specifications

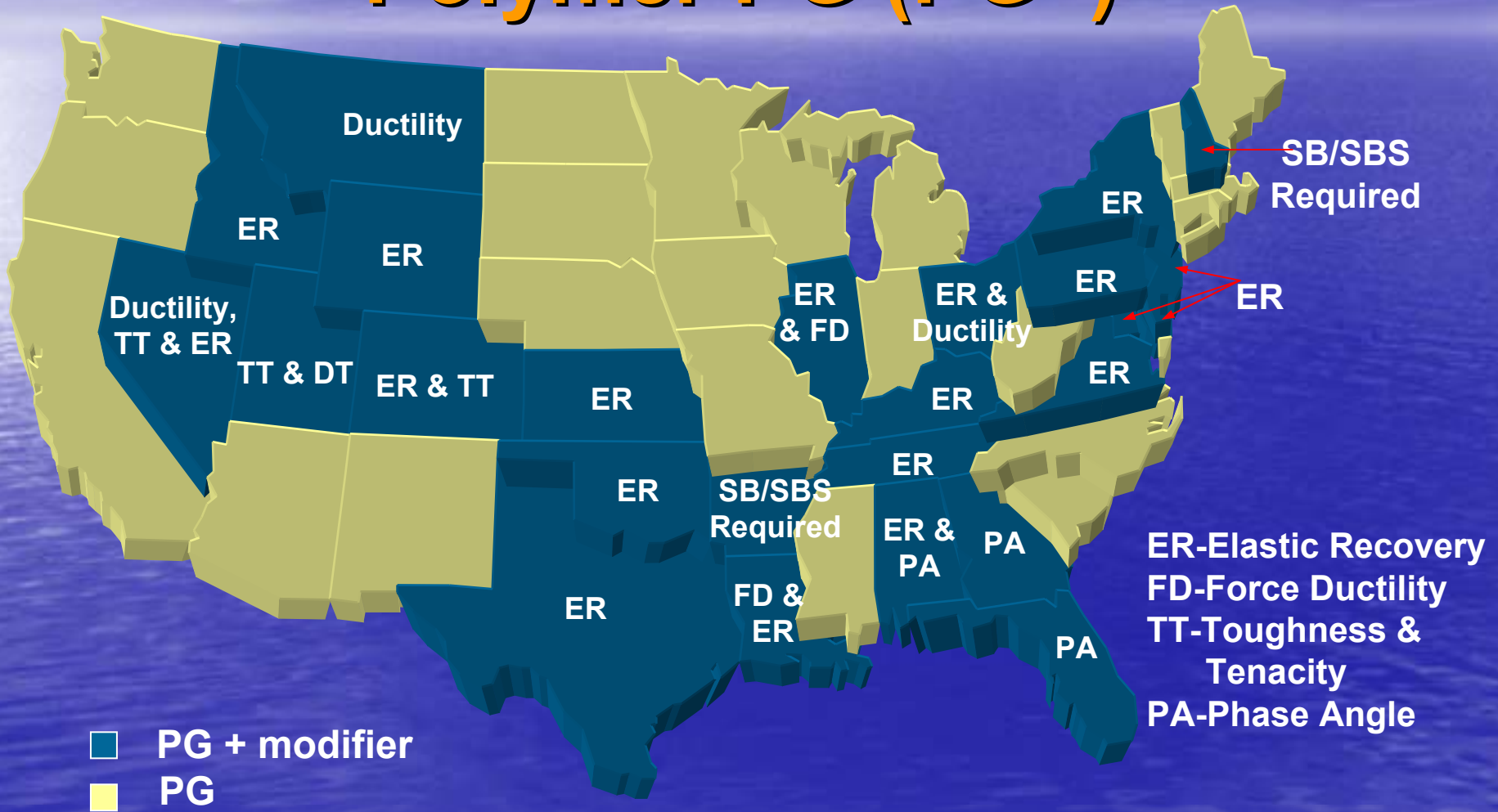
Why Superpave Plus Specs

- The existing specifications do not identify the performance characteristics of modified binders
- The existing specifications do not have a criteria for fatigue of durability
- Agencies look to other tests to identify modifiers

Superpave Plus Specifications

- Most of tests used today by agencies to identify modified binders are not performance related
- Forced Ductility (FD), Elastic Recovery (ER), and Toughness and Tenacity (TT) do not relate to performance

State DOT's Specifying Polymer PG (PG+)



“Understanding the Performance of Modified Asphalt in Mixes”

NCHRP funded study performed by FHWA for evaluation of:

- Effects of several typically-used polymer modifiers on mix performance

<u>Modifier</u>	<u>Scale Up</u>
Air Blown(*)	75-29
Elvaloy®	78-32
SBS lg	72-33
SBS l	71-31
SBS rg	72-32
EVA	76-31
EVA g	74-32

FHWA
ALF



Superpave: Future for Mixtures

Gyratory Comparisons



Internal Angle Measurement

- **Factors Influencing Angle of Gyration**
 - SGC Frame Compliance
 - SGC Maintenance
 - SGC Mold Wear
 - Mixture Stiffness

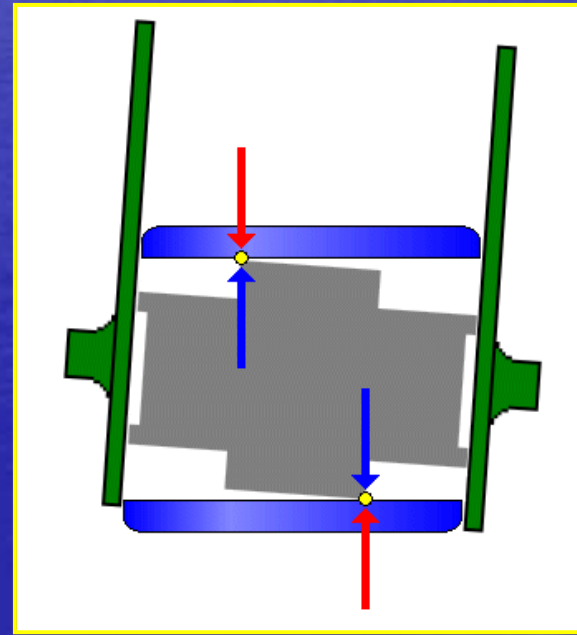


SGC Internal Angle

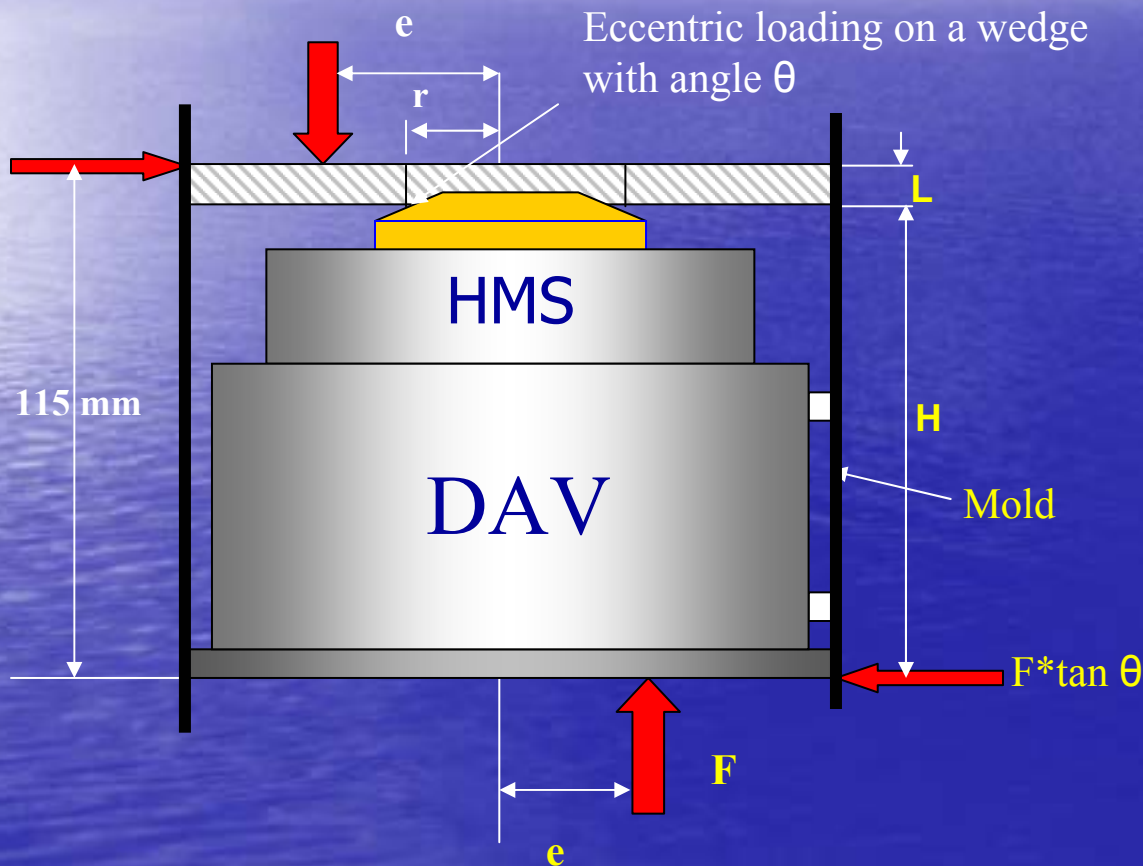
Superpave ETG / ASTM Task Group(s):

- AASHTO T312
- AASHTO DAV Specification PP48
- Improved Internal Angle Measurement

Internal Rapid Angle Measurement



Hot-Mix Simulator (HMS)



Aggregate Imaging System

- Captures coarse & fine aggregate properties
 - Shape
 - Angularity
 - Texture (coarse agg)

**Potential use for aggregate QC
or input to mix design**



Superpave Performance Tester

- ❖ **Used for providing input to mechanistic pavement**
- ❖ **Potential as Pass/Fail test or Quality Verification for asphalt mixes**

Background

Superpave Performance Test (SPT)

- ❖ Equipment part of NCHRP 9-29 protocol testing
- ❖ Two first-article prototype devices evaluated

Interlaken



Shedworks



Dynamic Modulus (E^*)

- Yields Input into Structural Design in 2002 Design Guide
- Addresses Rutting and Cracking

Static Creep (flow time)

- Test Equipment Simple to Use
- Minimal Training

Repeated Load (flow number)

- May be Best Simulation of Actual Load

Asphalt Construction

Lab/Field Tools

- New Gsb, Moisture
- Superpave Gyrotory Compactor angle kit (DAV)
- Aggregate Imaging System (AIMS)

Innovative Contracting

- Performance Related Specs (PRS)
- Warranty Construction

NCHRP 1-37(A)

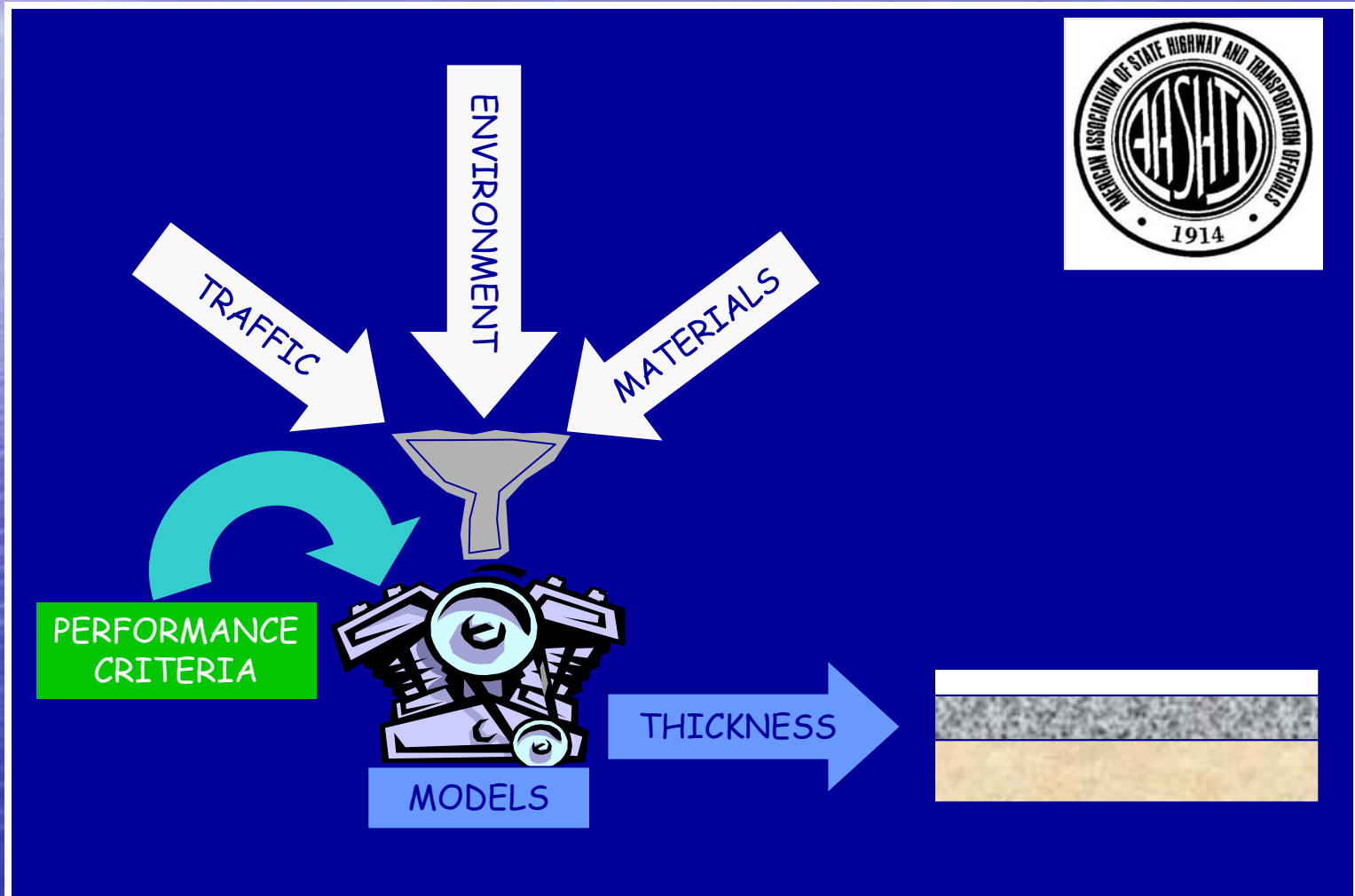
New Pavement Design Guide

Develop and deliver a guide for design of new and rehabilitated pavement structures

- Based on mechanistic-empirical principles
- Accompanied by the necessary computational software
- For adoption and distribution by AASHTO



Proposed Pavement Design Guide



NCHRP 9-33: *A Mix Design Manual for Hot Mix Asphalt*

Update the 1993 method and manual:

- **Superpave performance test(s)**
- **As-delivered 2002 design guide performance models and software**
- **Spreadsheets for volumetric design, performance testing, and design optimization.**

(RFP Issue: End 2003)

Asphalt Today and Tomorrow

- **AASHTO New Pavement Design Guide**
 - On track – validation required (NCHRP)
- **Superpave System**
 - Binder specification - modifiers?
 - Mix Design – Superpave Performance Tester
 - Models System – framework on track
- **Construction Practices**
 - Tools: New Gsb, Moisture, SGC angle kit...
 - Contracting: PRS framework, Warranty

Thank you for your attention!

Questions ?