IDOT HMA UPDATE

Illinois Asphalt Pavement Association

69th Annual Meeting

March 13, 2006

Equipment Update

Equipment Update

- Thin lift Nuclear Gauge
- Gyratory Internal Angle Device
- Paver Anti-Segregation Kits

Thin Lift Nuclear Gauge

3450 Review

- 2003 used on 4.75mm demo projects
  - 3 projects
  - Better performance than standard backscatter on thin lifts 1” or less
- 2005 testing Binder & Surface on I-72
  - Data under review
- Impact
  - Potential for future usage

Gyratory Internal Angle Device

Gyratory Internal Angle Device

- BMPR mass purchased 10 DAV's w/ HMS
  - 1 per district
  - 1 for BMPR
- BMPR developed & conducted training on use of devices for district personnel

Implementation

- BMPR will use DAV II w/ HMS for:
  - Initial private lab inspections
  - District lab inspection
- District will use device to:
  - Keep their equipment in calibration
  - Check all private labs during biannual lab inspections by Jan 2007
  - Adjustments to be made by private lab personnel
- Contractors are not required to purchase internal angle devices.

Paver Anti-Segregation Kits

Paver Anti-Segregation Kits

- Specification in effect since January 1, 2005
- Still seeing some problems at center of mat
  - Streaking
  - Low Density
- May need to revisit specification

HMA Mixture Update

HMA Mixture Update

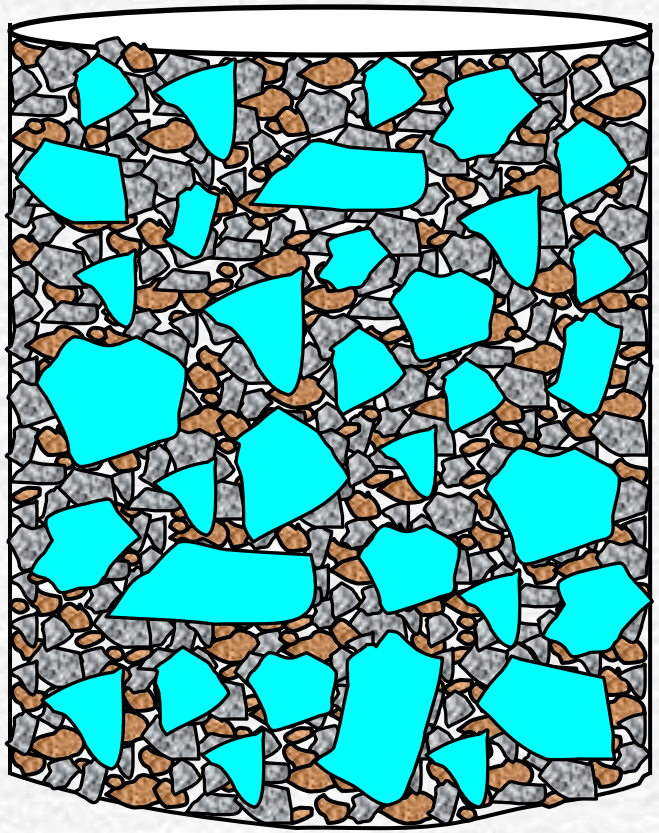
- Fine Graded Mixtures
- IL-4.75
- Semi-Flexible (Resin Modified)

Fine Graded Mixes

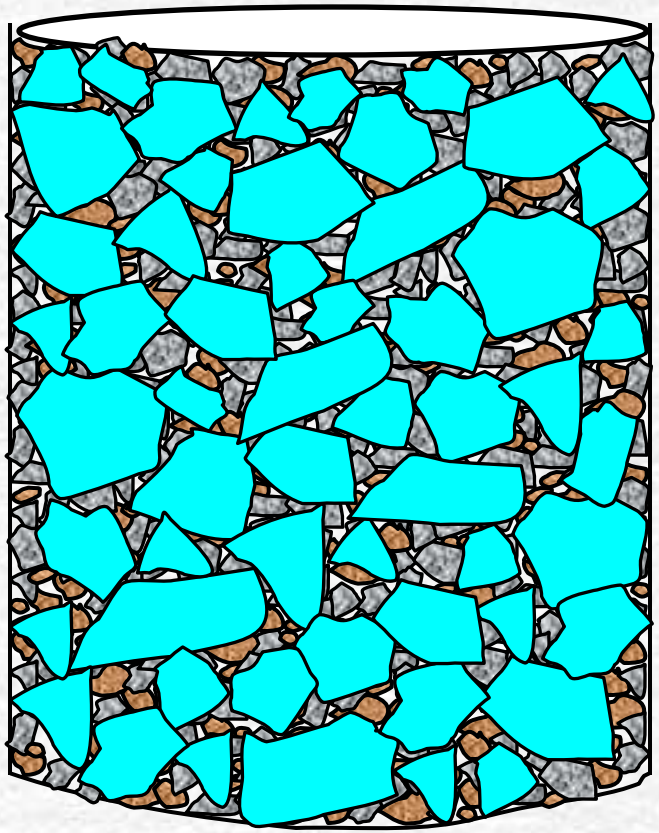
Fine Graded Mixes

- Info. presented at Bailey Method Class sparked interest for use as level binder
- What are Fine Graded Mixes?
  - Little or no CA particle contact
  - Fine aggregate carries most of the load
  - Gradations typically plot above Max density line of 0.45 Power Curve

Fine Graded



Coarse Graded



Fine Graded Mixes

- Anticipated benefits:
  - Higher achievable density at ¾ inch than conventional level binder
  - Density spec ≥ 91.0%
  - Lower permeability than conventional level binder
  - Cheaper than IL-4.75

Implementation

- Draft Specification has been developed
- Limit 2006 usage to 3 or 4 demonstration projects

IL-4.75 Mixture Update

IL-4.75 Mix Update

- While a preferred option over conventional level binder, it's not widely used because of high cost
  - PG 76-28 (most expensive grade in IL)
  - AC content 8½ %
  - 5% MF
- BMPR utilized various strength tests to determine if cost could be lowered by reducing PG grade w/out loss of strength

Tests

- APA – Loaded Wheel Tester
  - Pressurized rubber hose between wheel & specimen
  - Steel wheel rides directly on specimen
  - Measures rut depth
- PINE Rut Tester – Loaded Wheel Tester
  - Specimen "squeezed" between 3 rotating wheels
  - Measures rut depth

Tests

- **Indenter**
  - A 6” diameter steel plate with a 4” diameter cylinder on one end
  - Placed in the gyratory mold on top of a compacted specimen for 300 gyrations
  - Measures height change

- **Stability**
  - 4” Marshall & 6” Gyratory
  - Measures load

Costs & Testing

- Cost of Asphalt for 4) PG Grades Quoted
  - Per ton of Asphalt, and
  - Per ton of Mix
- Greatest Cost Difference Occurred from 64-22 to 70-22
- Testing Used:
  - 2) 4.75mm Mixes
  - 4) PG Grades
  - 5) Tests

Observations & Recommendations

- PG 64-22 to PG 70-22
  - Significant Improvement on ALL Tests - ($6.49 per ton justified)
- PG 70-22 to PG 76-22
  - Significant Improvement on Almost ALL Tests ($1.30 per ton justified)
- PG 76-22 to PG 76-28
  - Improvement on 2 of 5 Tests ($1.73 per ton questionable - unless thermal cracking is a concern)

Semi-Flexible (Resin Modified) Pavement

Semi-Flexible Pavement

- **What is it?**

  Open graded bituminous mat flooded with a micro-silica based cement grout.

Semi-Flexible Pavement

- **How is it constructed?**

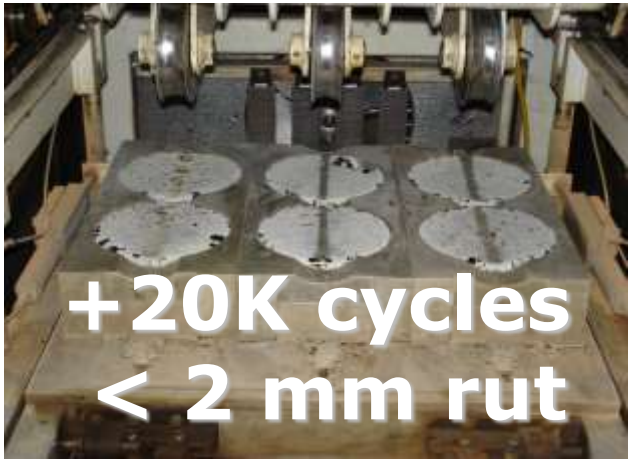
  A CA-11 stone is coated with 2.5% of a neat PG grade 64-22 asphalt and compacted to a void content of 25-35%.

  The open graded asphalt mix is then flooded with a micro-silica mortar mix and allowed to cure for 24 hours, before being open to traffic.

Semi-Flexible Pavement

Semi-Flexible Pavement

- What has IDOT done?



Semi-Flexible Pavement

- Possible candidate project in R2/D3 at the intersection of US 24 and IL 49 in Iroquois County.
- Looking for test projects. Ideal candidates are low speed, high shear areas prone to rutting, shoving, or cracking where construction time is limited.

  i.e. intersections

Recycling

Reclaimed Asphalt Pavement

(RAP)

Recycling
Reclaimed Asphalt Pavement (RAP)

Let's Rap on RAP

- **Usage is in Chapter 53 BD&E Manual.**
- **Used successfully for 20 years.**
- **Improvements made over the years.**
- **Current program is more Mill & Fill than new FD or OL.**
- **RAP surplus being generated in the Metro Chicago area.**

Recycling
Reclaimed Asphalt Pavement (RAP)

More RAP'n

- **Some agencies are not allowing RAP by showing "0% RAP" on plans.**
- **SB 120 introduced:**
  - **All mixes to use RAP and Rubber Tires.**
  - **Died in committee.**
- **Need to follow sound usage of resources or it will be legislated to us.**

Recycling
Reclaimed Asphalt Pavement (RAP)

Recycling Summit – 3 meetings

1. **RAP as aggregate.**
   - **Allow RAP/Aggregate Blends**
2. **Revisit RAP use in HMA.**
   - **Allow up to 10% RAP in Poly mixes, except N105**
3. **Concrete as Aggregate.**
   - **Explore higher demand uses i.e. chips in HMA**

FHWA Technical Advisory

FHWA Technical Advisory

- **Focuses on Independent Assurance Sampling/Testing & PWL Statistical Acceptance**
- **IDOT looking at addressing TA concerns with:**
  - **Improved Sample Security which will likely involve sampling at jobsite**
  - **ERS w/ PWL for large projects & possible ERS w/ step based pay for small projects (no complicated statistics)**

Jobsite Sampling

- **Benefits**
  - Utilize state personnel on jobsite to secure sample
  - More representative
- **Types of Sampling**
  - MTD sampling
    - Interstates
  - Plate or scoop sampling
    - Off Interstate when no MTD

Jobsite Sampling

MTD sampling

Plate sampling

Jobsite Sampling

Jobsite Sampling

- **BMPR will solicit 1 demo project / district in 2006 to utilize MTD, plate, or scoop sampling for project assurance testing.**
  - **Samples to be obtained by contractor personnel at a random time designated by district**
  - **Sampling observed by Dept. personnel**
  - **Samples secured by Dept. personnel**

ERS Update

2005 ERS Construction

- D2 – 1 project
- D3 – 4 projects
- D4 – 1 project
- D5 – 1 project

** 1st disincentive this year (50+ total mixes evaluated)

Considerations

- ERS meets most of TA concerns
  - Sample security needs improvement
- ERS for interstates may not be far off
- Recommend involvement to help guide future changes and implementation
  - District benefit
  - Contractor benefit

Pavement Preservation

FY 2006 Projects

- **Programmed ~$300,000**
  - **2 Bituminous Surface Treatments**
  - **2 Micro-Surfacing (1 project @ 1-Pass, other undecided)**
  - **1 Slurry Seal**
  - **2 Cape Seals**
  - **8 Half-SMART Surfaces**
- **8 projects let on or before August 5, 2005**
- **7 projects to be let in Spring 2006**

Memorandum Issued

- Pavement Preservation Guidelines
- Memorandum issued September 19, 2005
- BDE Procedure Memorandum 47-05
- BMPR Policy Memorandum 05-06

Profile Equipment Verification (PEV) Program

PEV Program

- Meet FHWA QC/QA testing requirements
- Equipment used on projects including 0.00-inch blanking band special provision
- Started with August 5, 2005 letting

2005 Test Program

- 4 District California Profilographs
- 1 BMPR Lightweight Profiler
- 14 Contractor Devices
  - 2 Lightweight Inertial Profilers
  - 11 California Profilographs
  - 1 Tow Behind Profilograph

2006 PEV Program

- Notice in "Letting You Know"
- Two weeks of testing (dates TBD)
- Contact Person:

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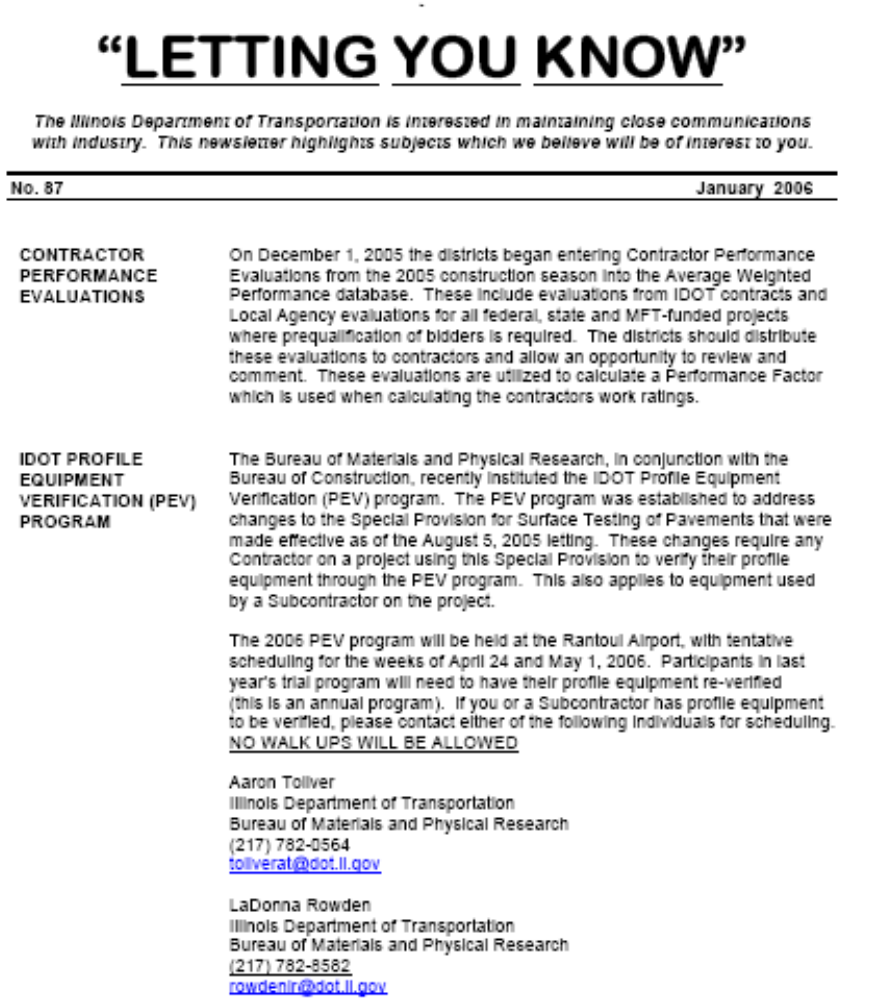

"LETTING YOU KNOW"

The Illinois Department of Transportation is interested in maintaining close communications with industry. This newsletter highlights subjects which we believe will be of interest to you.

No. 87 January 2006

CONTRACTOR PERFORMANCE EVALUATIONS

On December 1, 2005 the districts began entering Contractor Performance Evaluations from the 2005 construction season into the Average Weighted Performance database. These include evaluations from IDOT contracts and Local Agency evaluations for all federal, state and MFT-funded projects where prequalification of bidders is required. The districts should distribute these evaluations to contractors and allow an opportunity to review and comment. These evaluations are utilized to calculate a Performance Factor which is used when calculating the contractors work ratings.

IDOT PROFILE EQUIPMENT VERIFICATION (PEV) PROGRAM

The Bureau of Materials and Physical Research, in conjunction with the Bureau of Construction, recently instituted the IDOT Profile Equipment Verification (PEV) program. The PEV program was established to address changes to the Special Provision for Surface Testing of Pavements that were made effective as of the August 5, 2005 letting. These changes require any Contractor on a project using this Special Provision to verify their profile equipment through the PEV program. This also applies to equipment used by a Subcontractor on the project.

The 2006 PEV program will be held at the Rantoul Airport, with tentative scheduling for the weeks of April 24 and May 1, 2006. Participants in last year's trial program will need to have their profile equipment re-verified (this is an annual program). If you or a Subcontractor has profile equipment to be verified, please contact either of the following individuals for scheduling. NO WALK UPS WILL BE ALLOWED

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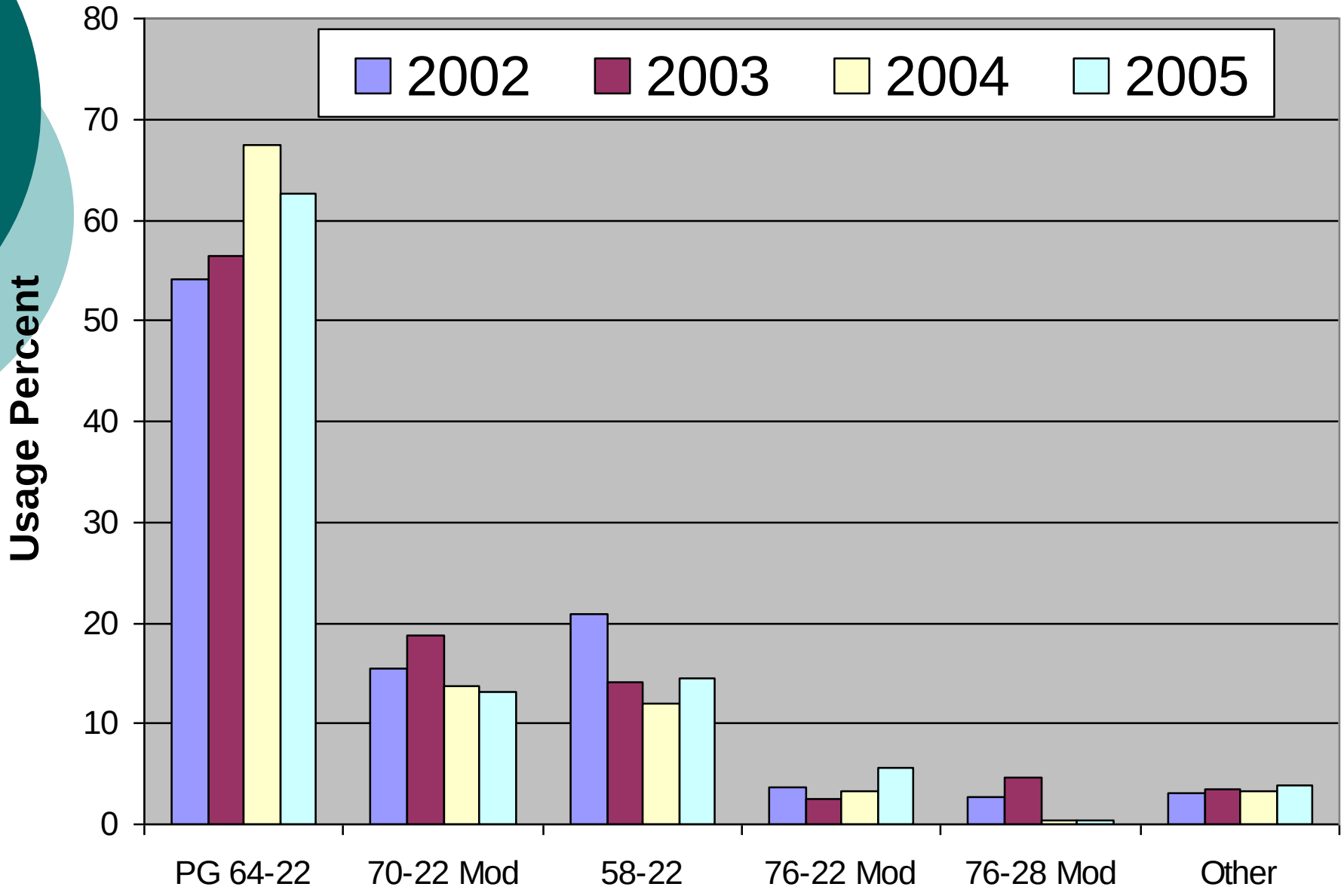
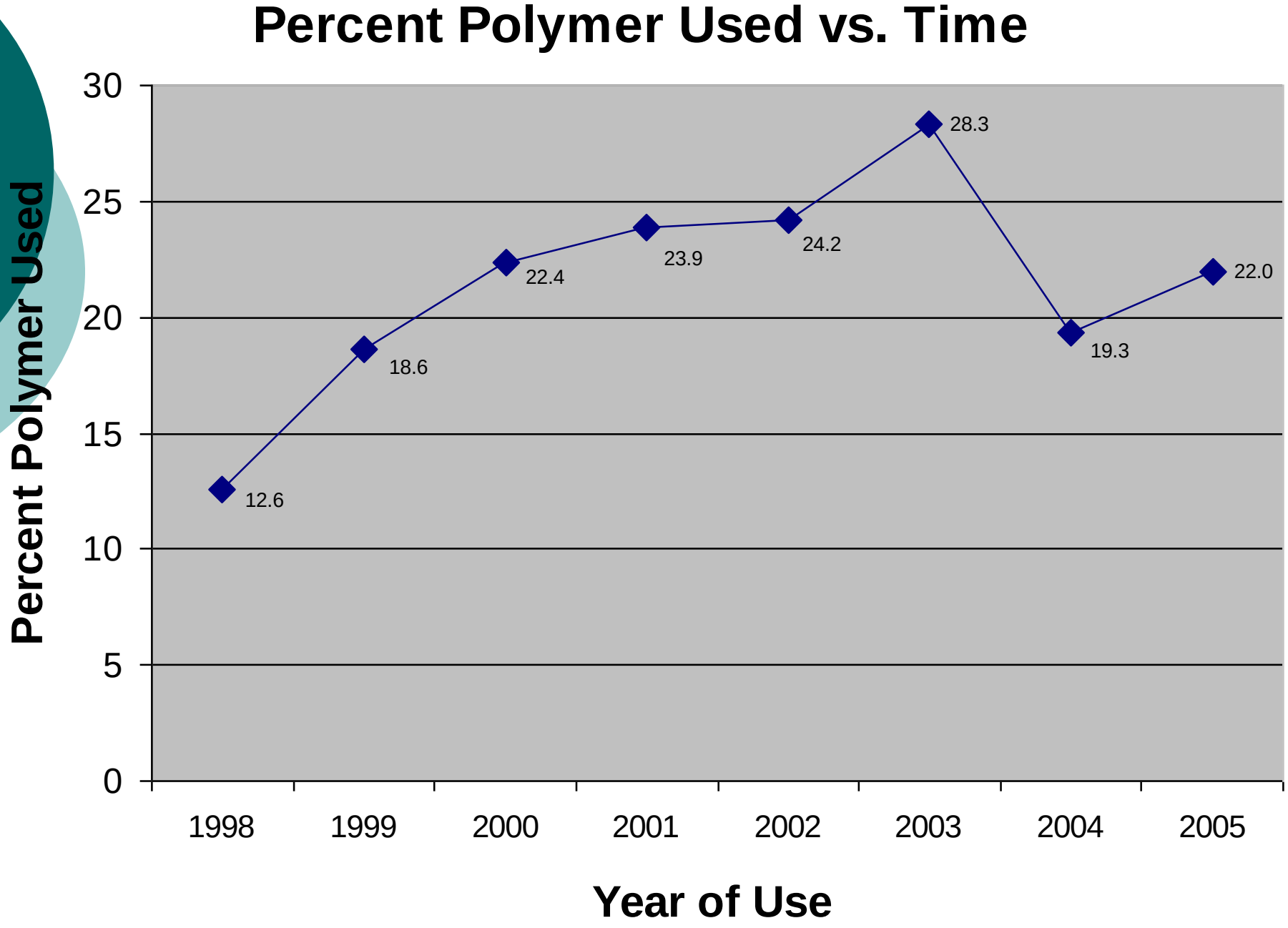
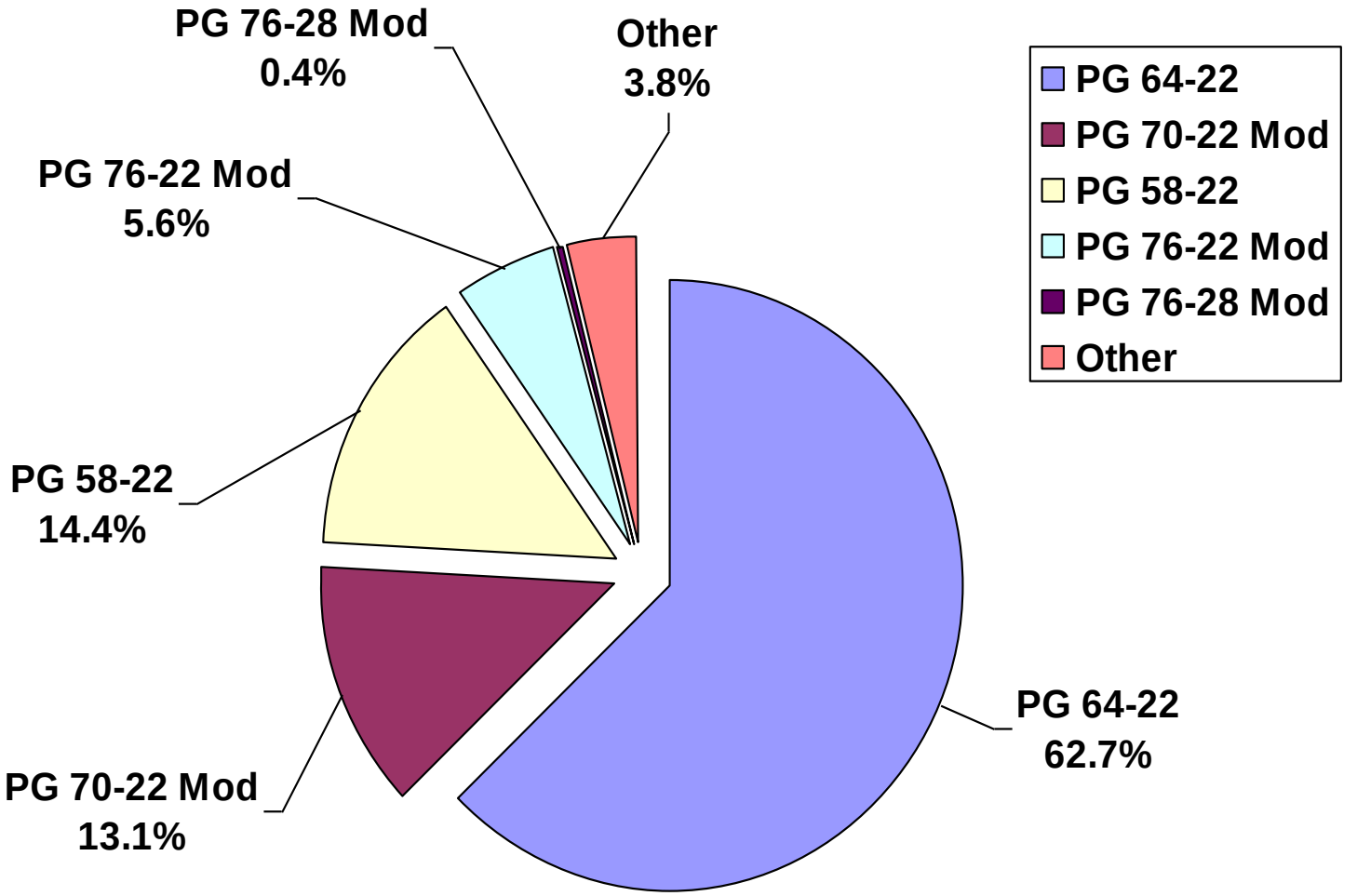
Binder Usage

2002 to 2005 Grade Usage




Percent Polymer Used vs. Time
Percent Polymer Used
30
25
20
15
10
5
0
12.6
18.6
22.4
23.9
24.2
28.3
19.3
22.0
1998
1999
2000
2001
2002
2003
2004
2005
Year of Use

Grades Used (2005 to Date)



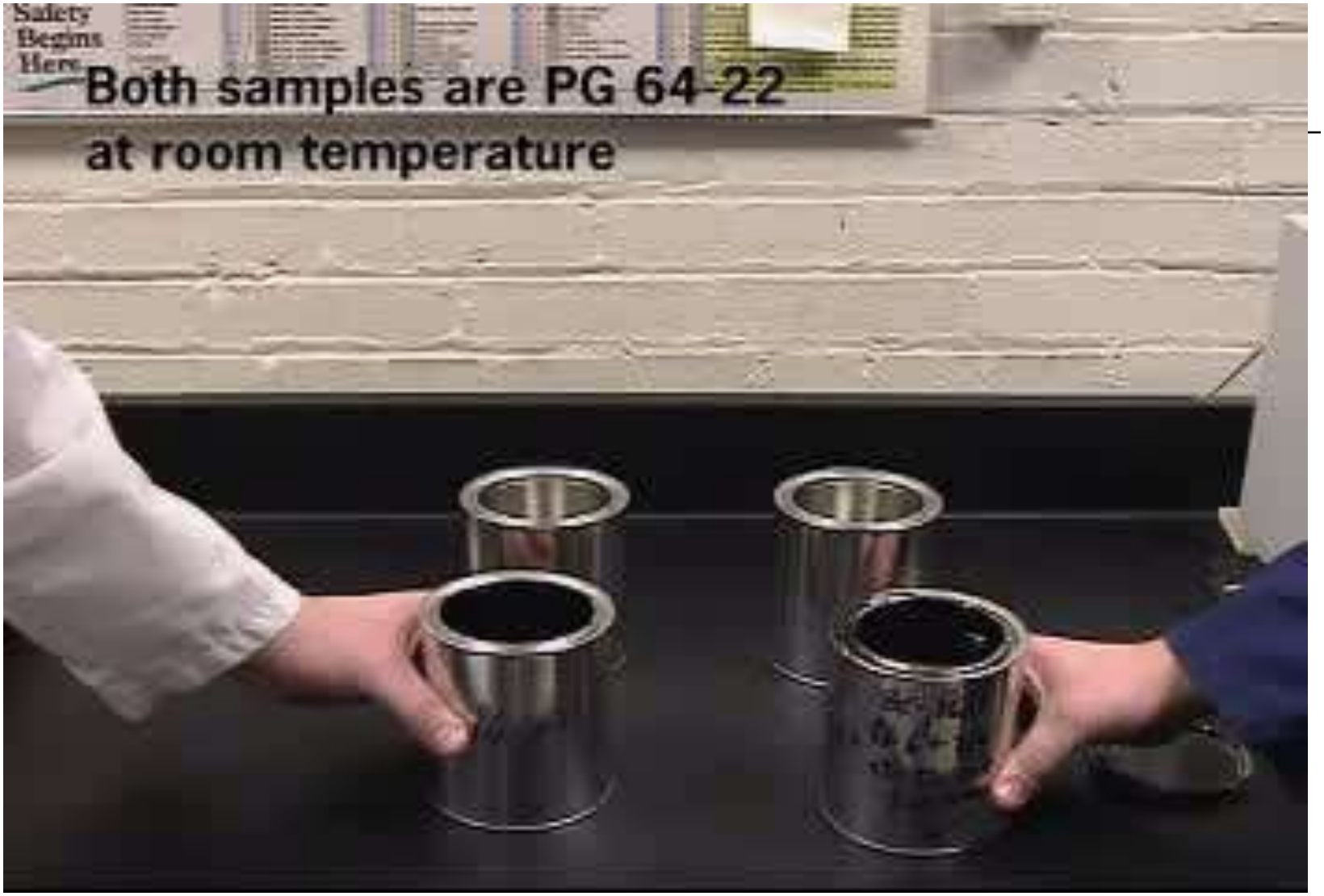
Asphalt Sampling & Failures

Make sure that we are getting what is specified “on the road”.

Samples –
What do they represent?

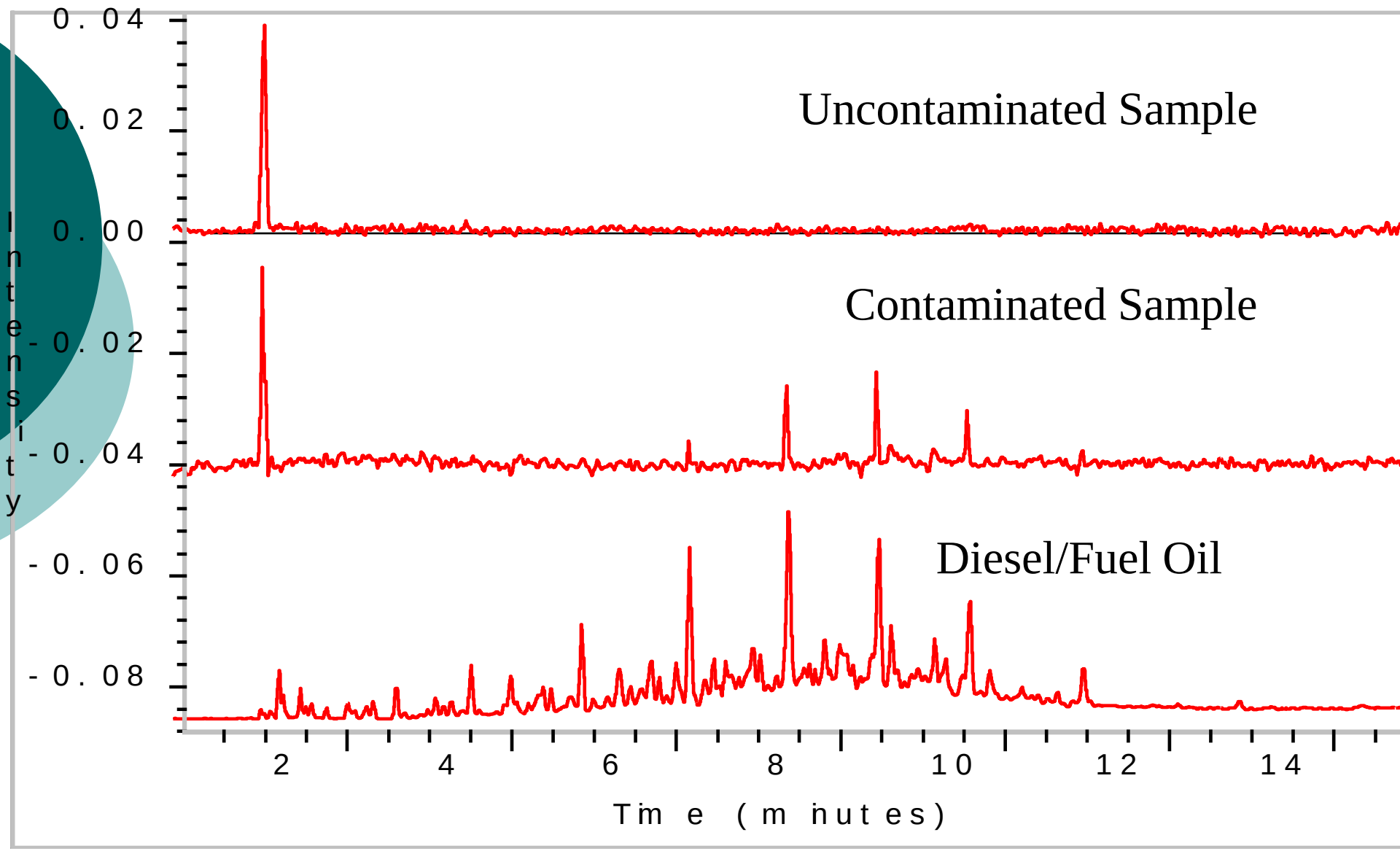
Jobsite Samples

- Can be taken anywhere, anytime.
- Properly Identified – haul truck, asphalt line or HMA tank.
- Must be witnessed to ensure sample **security and integrity**.


Safety
Begins
Here
Both samples are PG 64-22
at room temperature

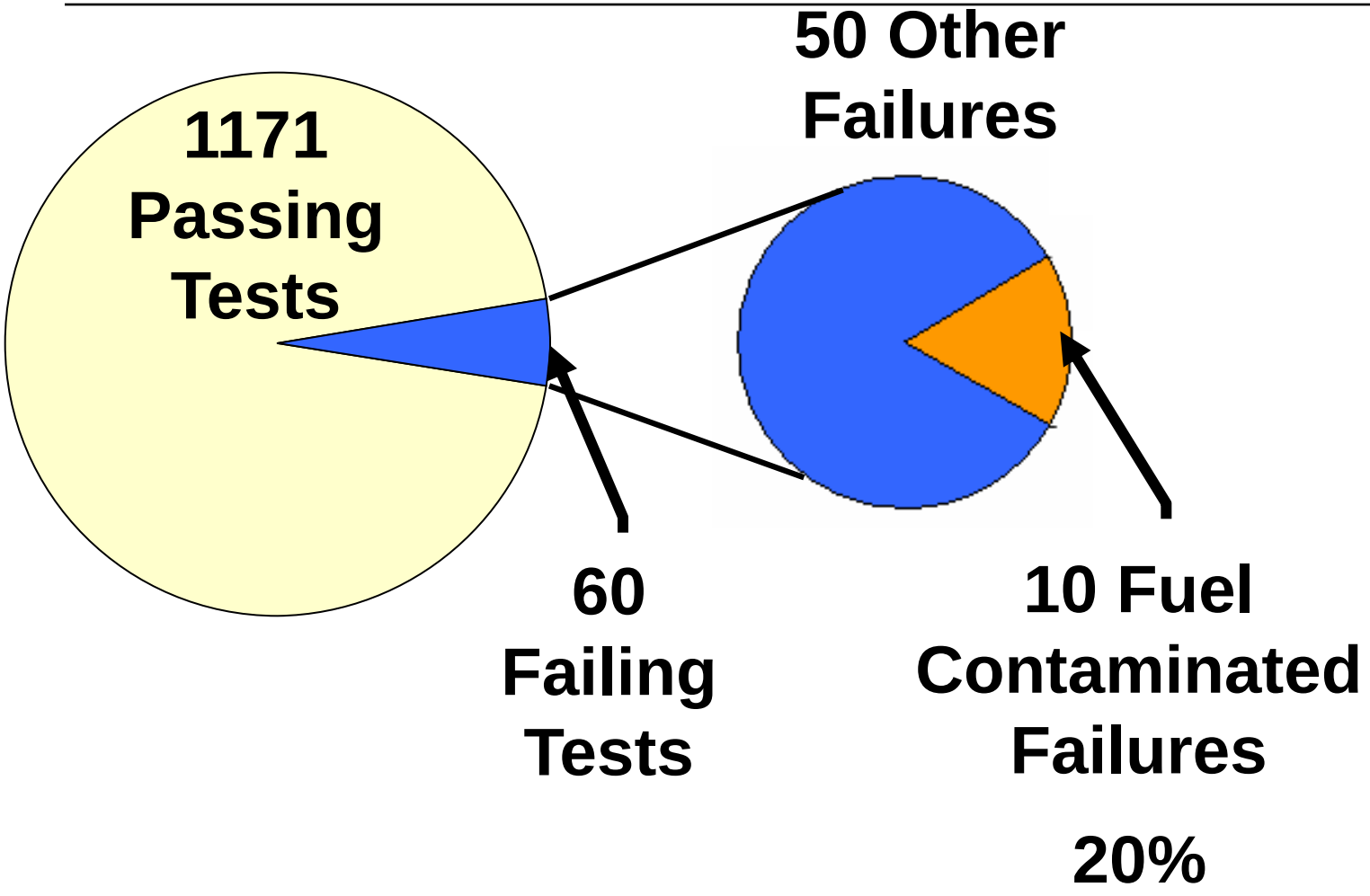
Gas Chromatograph (GC)

- Used to detect contamination with solvents, diesel or fuel oil.



GC Spectra Comparison

Binder Samples Tested in 2004



2005 Failures

- Several samples of a highly polymer modified PG 76-28 failed.
- Samples were from the same producer taken at different mix plants.
- Original tank results passed – but were borderline.

“Diluted” with unmodified binder

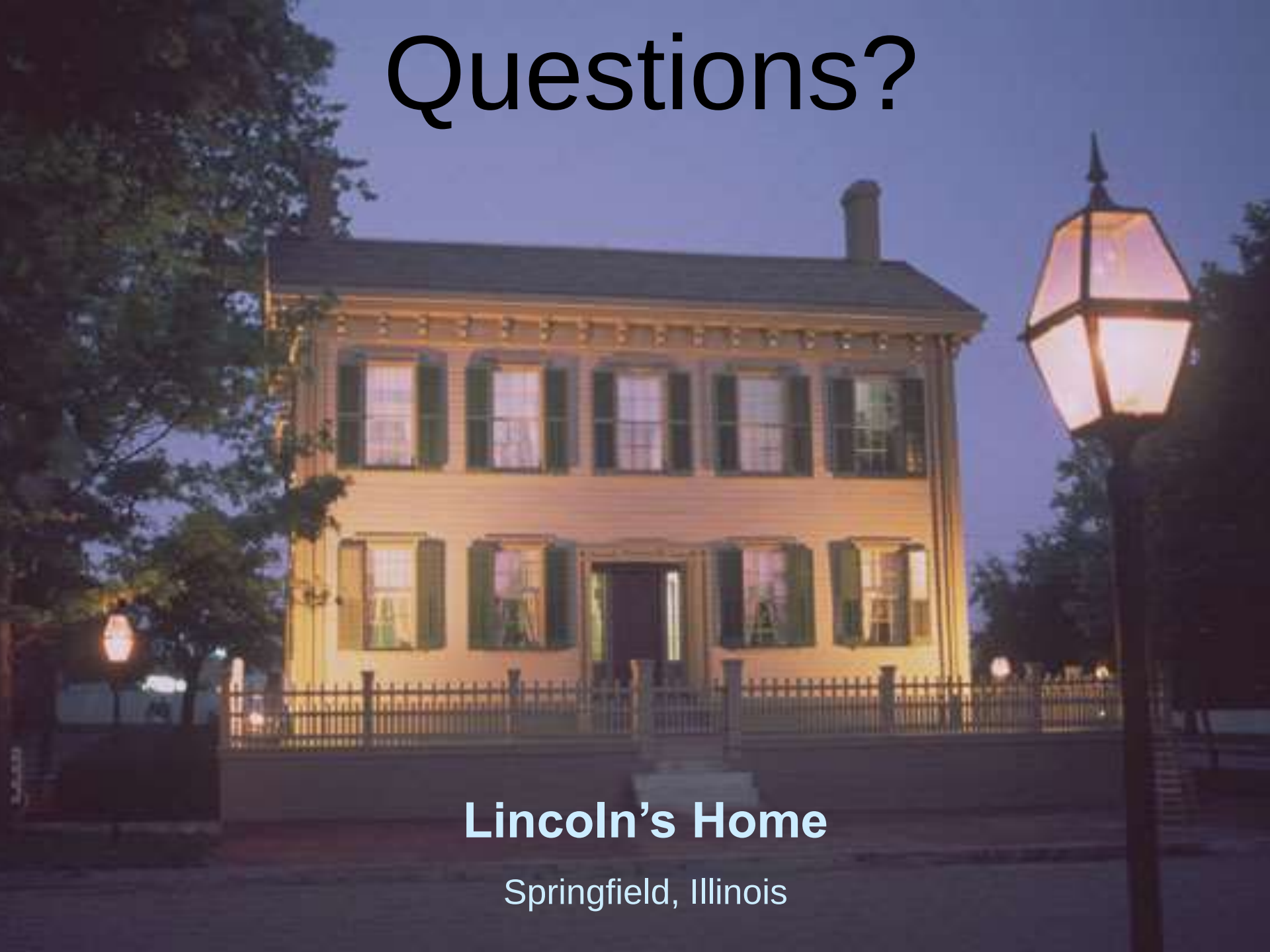
- Sand Mix jobs requiring small quantities transported in small loads.
- The Bills of Lading showed that over 2/3 of the loads shipped had been hauled in in trucks whose last load was an unmodified binder.
- These loads were then placed into tanks that may have contained small amounts of unmodified binder.

Suggested

For highly modified PG's w/limited use, it may be a good idea to keep the materials in the tanker and directly feed the HMA plant.

A. Lincoln Presidential Museum and Library

Questions?



Lincoln's Home

Springfield, Illinois