IDOT HMA Tech Briefs

63rd Annual Bituminous Conference

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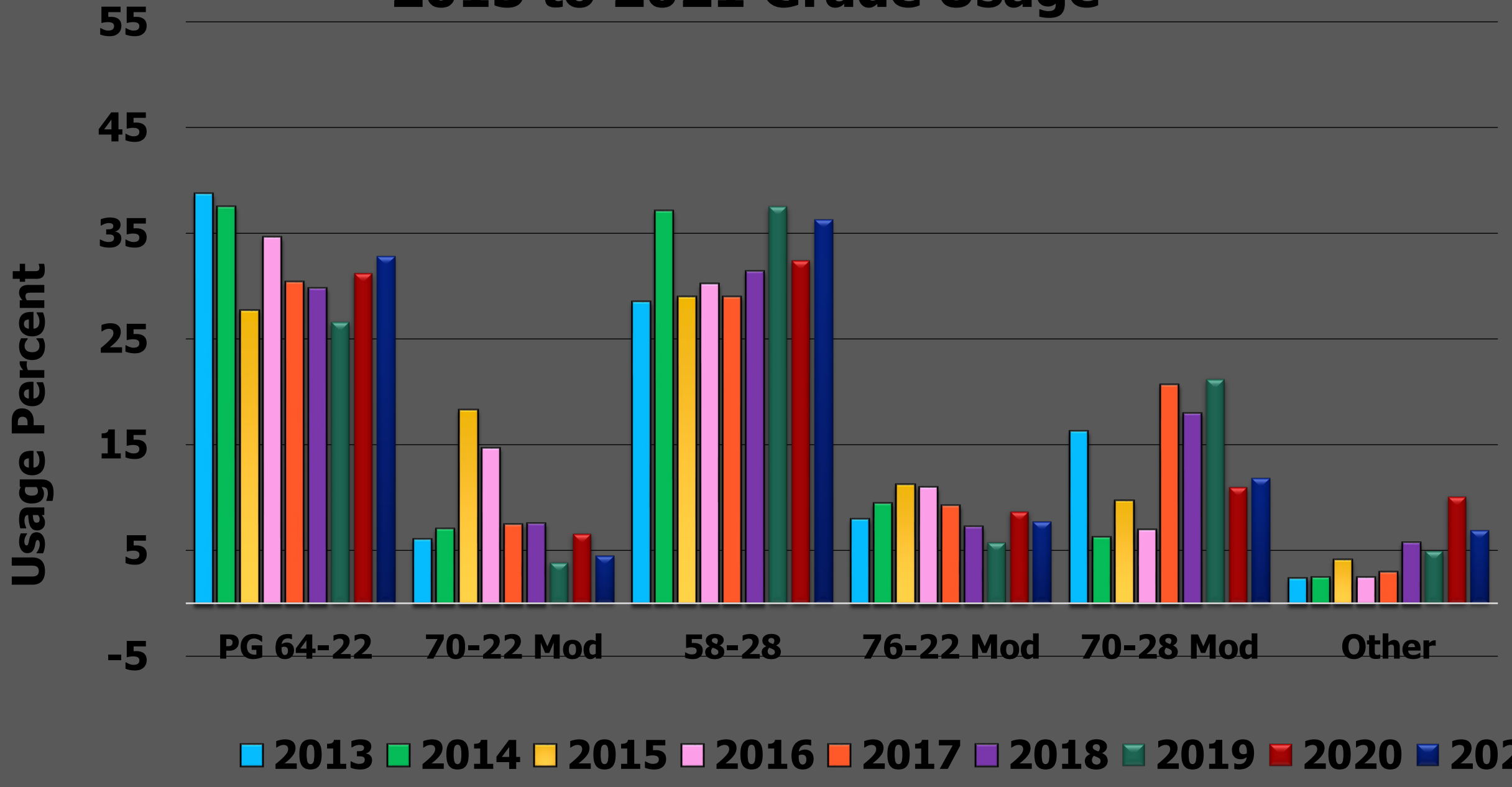
Illinois Department of Transportation

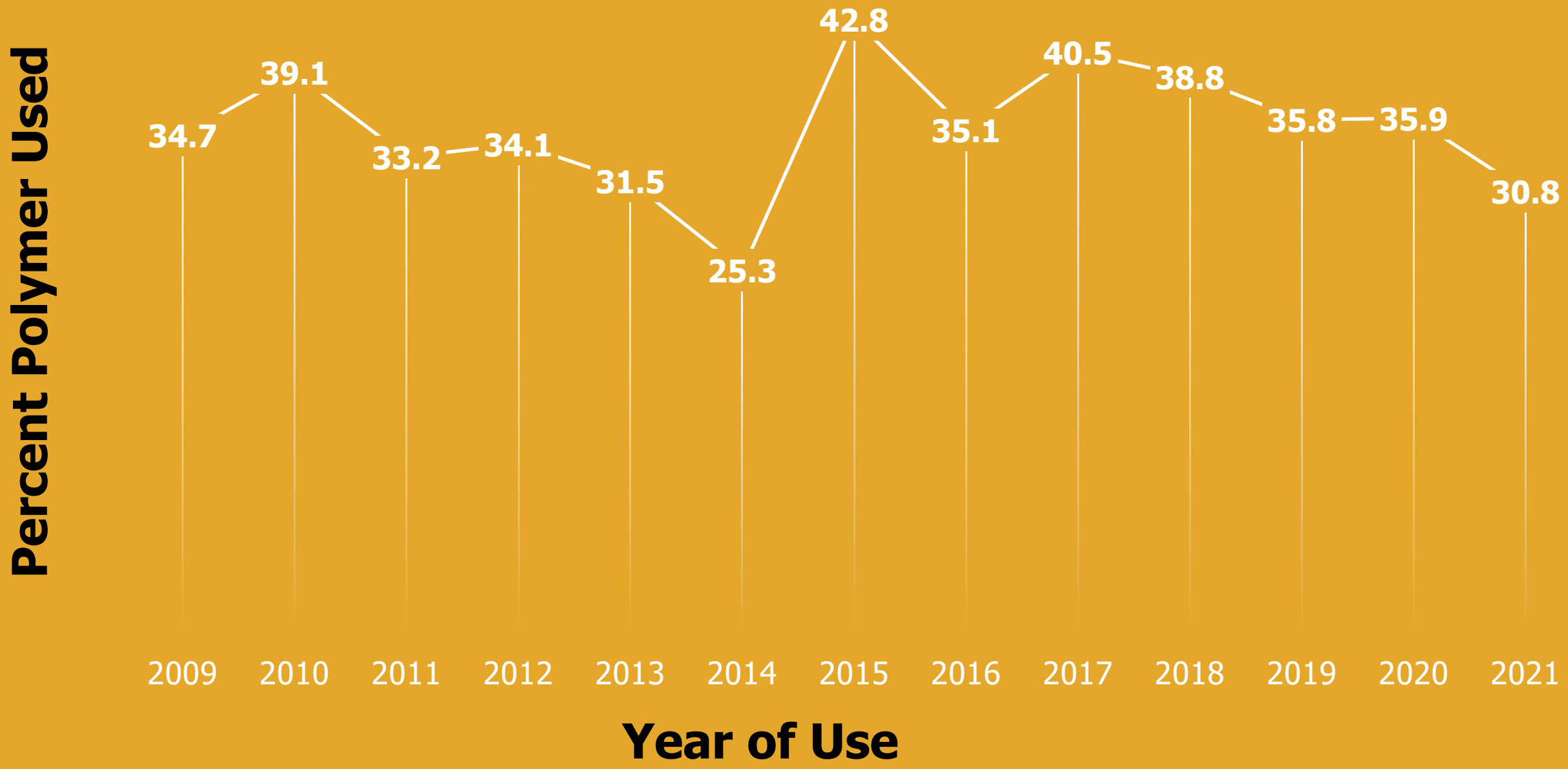
Chemical Test Update

1. PG Binder Usage and Trends
2. Research Update
3. Full Lane Sealant (FLS)
4. FLS Waterproofing System

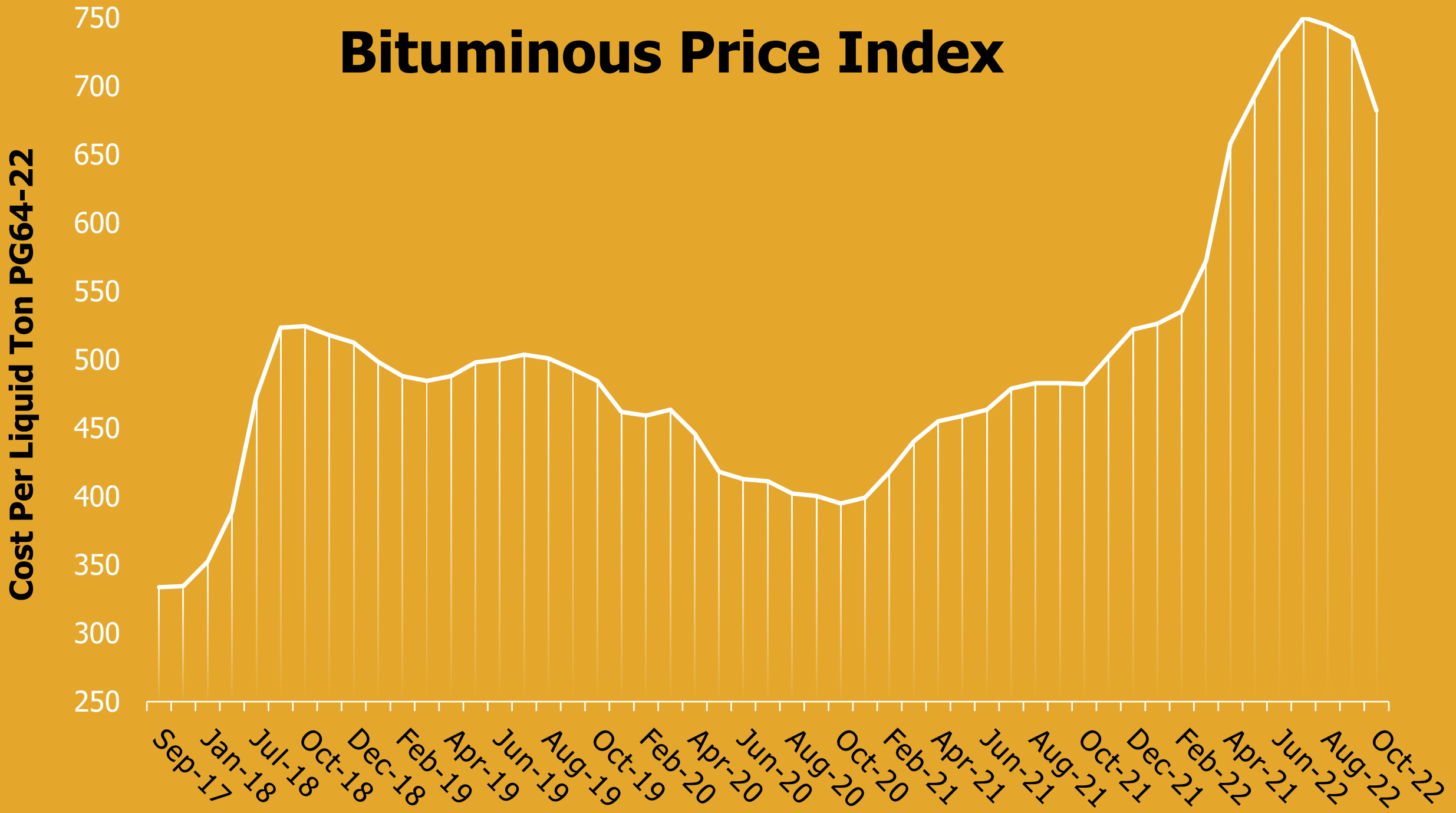
2013 to 2021 Grade Usage



Percent Polymer Used VS. Time



Bituminous Price Index



Asphalt Binder & HMA Research Timeline

2017 – 2019 => ICT R27-175, Development of LTA Protocol for I-FIT

2018-2021 => ICT R27-196HS, Rheology-Chemical Based Procedure to Evaluate Additives/Modifiers used in Asphalt Binders for Performance Enhancements.

- Completed & Drafted BDE Spec for Jan. 2022 to modify Article 1032.05 to include Δ Tc, Softener Modified (SM) binder requirements & GTR
- Industry had concerns & was therefore postponed 1 year

2022 => Worked w/ Industry to address concerns w/ BDE Spec & will be implemented Jan. 2023

2022 – 2024 => ICT R27-250, Using Advanced Binder Rheological Parameters to Predict Cracking Potential of Hot-Mix Asphalt Mixtures w/ Modified Binders

- Picks up where ICT R27-196HS left off
- Uses new protocol to evaluate Softener Modifiers used with Polymer Modified binders
- Determine relationship between Asphalt binder perf. tests with HMA perf. tests (I-FIT & H.W.)

Full Lane Sealant

Full Lane Sealant

Four Years Later - No visible difference between controls and FLS applications

FLS Waterproofing System

- Waterproofing system for bridge decks
- Uses FLS and low permeability HMA mixtures that are easier to achieve a higher density with static rolling
- Prevents the ingress of water and chlorides
- Provides an improved wearing surface
- More efficient & cost-effective means of construction than System in 581

#1

Tack Coat

0.05 lb./sq. ft.

#2

Full Lane Sealant

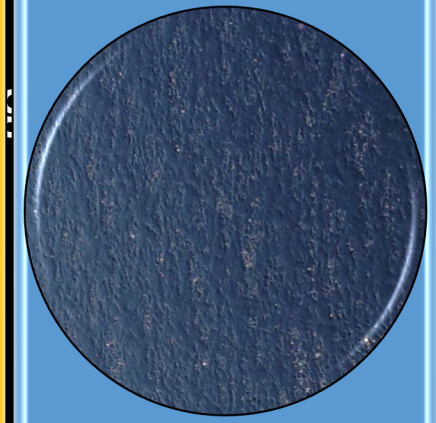
Interlayer

0.25 lb./sq. ft.

#3

HMA IL-4.75

¾ Inches



#4

Full Lane Sealant

Tack

0.15 lb./sq. Ft.

#5

9.5 SMA

1 ½ Inches

Full
Lane
Sealant
Waterproofing
System

Dist. 8 (I-255)
Year 2

Full Lane Sealant Waterproofing System Summary

1. Easier installation and construction.
2. System provides superior waterproofing
    - Water and chloride ingress mitigated.
    - After three years, levels of chlorides same as at time of installation
3. Bridge deck surfaces are wearing and performing well after 3 years
4. **No Longer Needs Experimental Features**

Longitudinal Joint Sealant (LJS) Update

LJS BDE Special Provision

- November 2022 Letting
- Added half width applications for inlays or narrow stage construction
- Added language requiring a fine agg. cover when LJS will be open to traffic
  - When rain forecasted &
  - When traffic/temperature is causing pickup/damage to the LJS

LJS Pre-formed Roll Specification Req'ts

1032.12 Longitudinal Joint Sealant (LJS). Longitudinal joint sealant (LJS) in the form of spray applied liquid or pre-formed roll will be accepted according to the Bureau of Materials Policy Memorandum, "Performance Graded Asphalt Binder Qualification Procedure". The Department will maintain a qualified producer list. The bituminous material used for the LJS shall be according to the following table. Elastomers shall be added to a base asphalt and shall be either a styrene-butadiene diblock or triblock copolymer without oil extension, or a styrene-butadiene rubber. Air blown asphalt, acid modification, or other modifiers will not be allowed.

Test	Test Requirement	Test Method
Dynamic shear @ 88°C (unaged), G*/sin δ, kPa	1.00 min.	AASHTO T 315
Creep stiffness @ -18°C (unaged), Stiffness (S), MPa m-value	300 max. 0.300 min.	AASHTO T 313
Ash Content, %	1.0 – 4.0 [1/]	AASHTO T 111
Elastic Recovery, 100 mm elongation, cut immediately, 25°C, % [2/]	70 min.	ASTM D 6084 (Procedure A)
Separation of Polymer, Difference in °C of the softening point (ring and ball) [2/]	3 max.	ILTP "Separation of Polymer from Asphalt Binder"

1/ For LJS in a pre-formed roll, the ash content shall be a maximum of 20 percent.

2/ For LJS in a pre-formed roll, this test shall be waived.

mpling & Testing

LJS Pre-formed Roll Sampling & Testing

- Contact Ron Price regarding Sampling & Testing of a proposed LJS Pre-formed Roll product
  - Ronald.Price@illinois.gov

QC/QA Implementation for Local Agencies

Local Agency QC/QA Special Provision

- Bureau of Local Roads & Streets (BLRS) Special Provision LR1030-2
  - Effective Jan. 1, 2022
- Local Public Agency (LPA) QC/QA Modifications of 2022 Std Spec Book
  - Eliminate QMP Specified based on Tonnage (i.e. QCP ≥ 1200 tons …)
  - Sampling at the HMA Plant
  - Optional Nuclear Density Testing

Local Agency QC/QA Training

- Live Webex Training Sessions held:
  - March 10 & 18, 2022
- Recordings available thru IDOT Technology Transfer (T2) Center
  - https://idot.illinois.gov/transportation-system/local-transportation-partners/county-engineers-and-local-public-agencies/technology-transfer-center/index
- Consultant developing additional training videos on:
  - Truck Sampling at HMA Plants
  - HMA Blending & Splitting
  - Random Density Location Determination
  - Random Mix Sample Determination

HMA Plant Approval Policy Memo

HMA Plant Approval Policy Memo Update

- Updated to require High ESAL & Low ESAL Approval Process for new plants only
- CBM still notified of all plant modifications for previously approved plants

IDOT Manual of Test Procedures Updates

IL Modified Standards
Temperature & Thermometers

- Majority of AASHTO standards updated for thermometers/ovens/water baths
- AASHTO Re:source is delaying enforcement of these changes for accredited labs to late 2024
- 2023 Plan for HMA-Related IL Mods.
  - Change new temperature & thermometer requirements to optional while maintaining previous IL Mod. requirements

HMA-Related Appendices

- Updates for 2023
  - B.6 – QC/QA Initial Daily Plant & Random Samples
    - Shifting Sample Locations for Safety
    - Plant Sampling Road Widener Paving Applications
  - B.10 – Drum Plant Calibration
  - 2022 Addenda
    - B.9 – Mix Design
    - E.5 – PFP Dispute Resolution
    - E.8 – PFP & QCP Calculations of Monetary Deductions

Miscellaneous Topics

Lake Land QMP Training

- Recertification:
  - Continuing to work w/ LLC to set up QMP Recert Program beginning in Fall of 2023
  - 3-year Phase-In w/ most recent being lowest priority (i.e. 15 or longer, 10-15, 5-10)
  - Required every 5 years
  - Written exams for highest Level taken but will include material from lower levels
  - Self-Paced Online Review Sessions
  - Lab Proficiency Testing required for 5-Day Aggregate & Level I Techs (held during the Fall of each year)

2022 Asphalt Release Agent (ARA) Field Testing

2022 ARA Field Testing Summary

- **37** samples submitted
  - **9** different ARA manufacturers & **13** different products
  - Multiples & replicates from different Contractors submitted
  - **110** individual Ultrasonic Strip Tests completed
  - **ALL** tests passed Ultrasonic Strip Test

ARA FTIR Fingerprinting

- All approved products have FTIR fingerprint now
- CBM currently has threshold limit of 85% min.
- **32** of **37** samples met the 85% limit
- **2** samples did not meet 85% limit
- **3** samples not tested
  - **1** sample => Dilution issues
  - **2** samples => Not on the QPL

Thank You For Your Attention

Illinois Department of Transportation

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Happy Trails