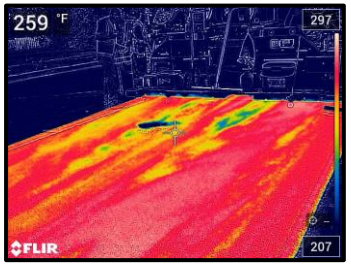
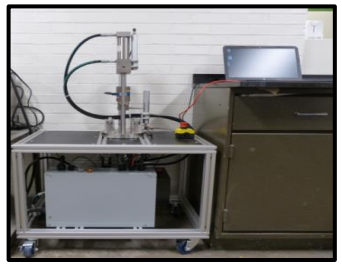


IDOT HMA Technical Update

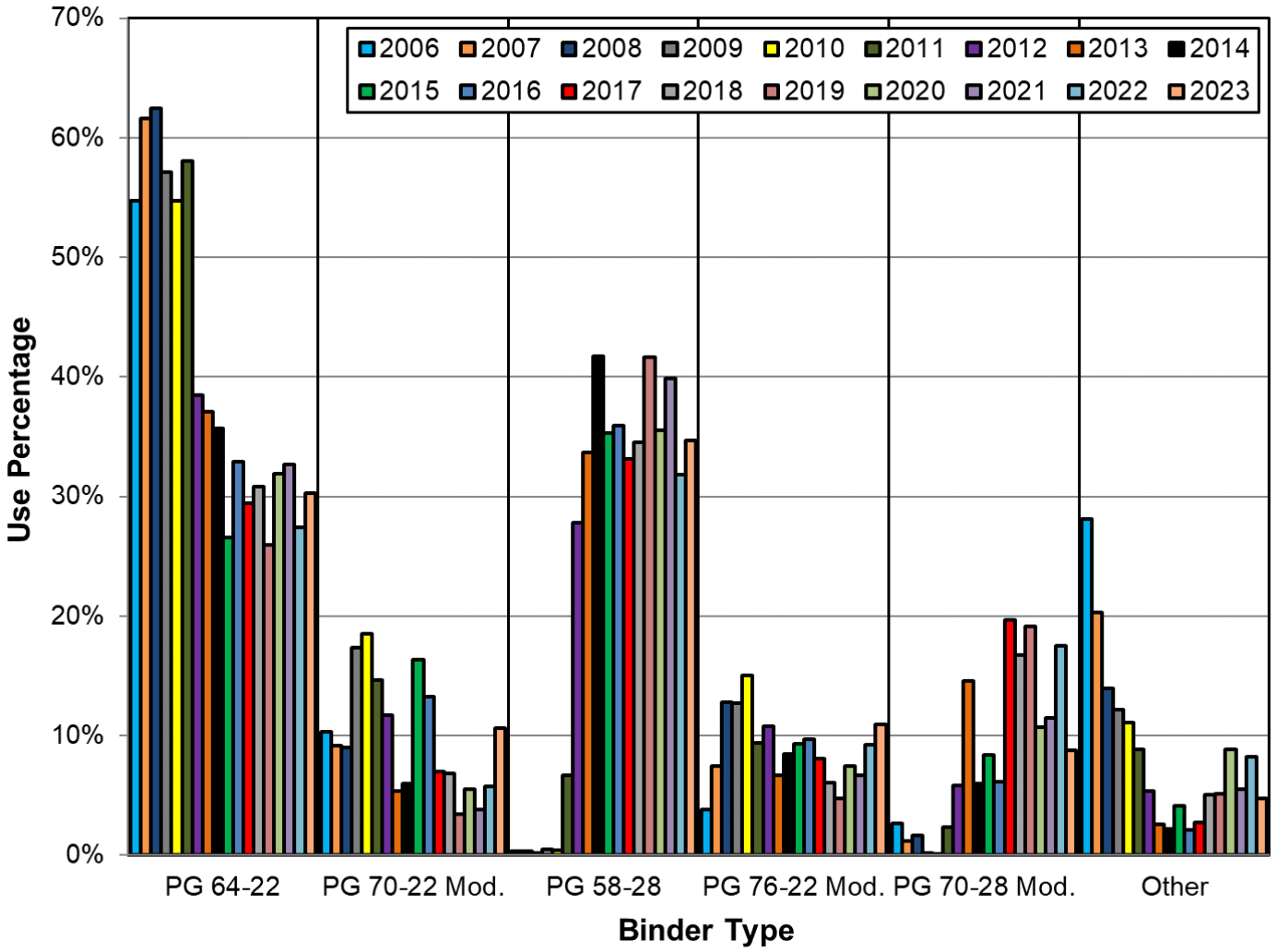
65th Annual Illinois Bituminous Paving Conference



Illinois Department of Transportation

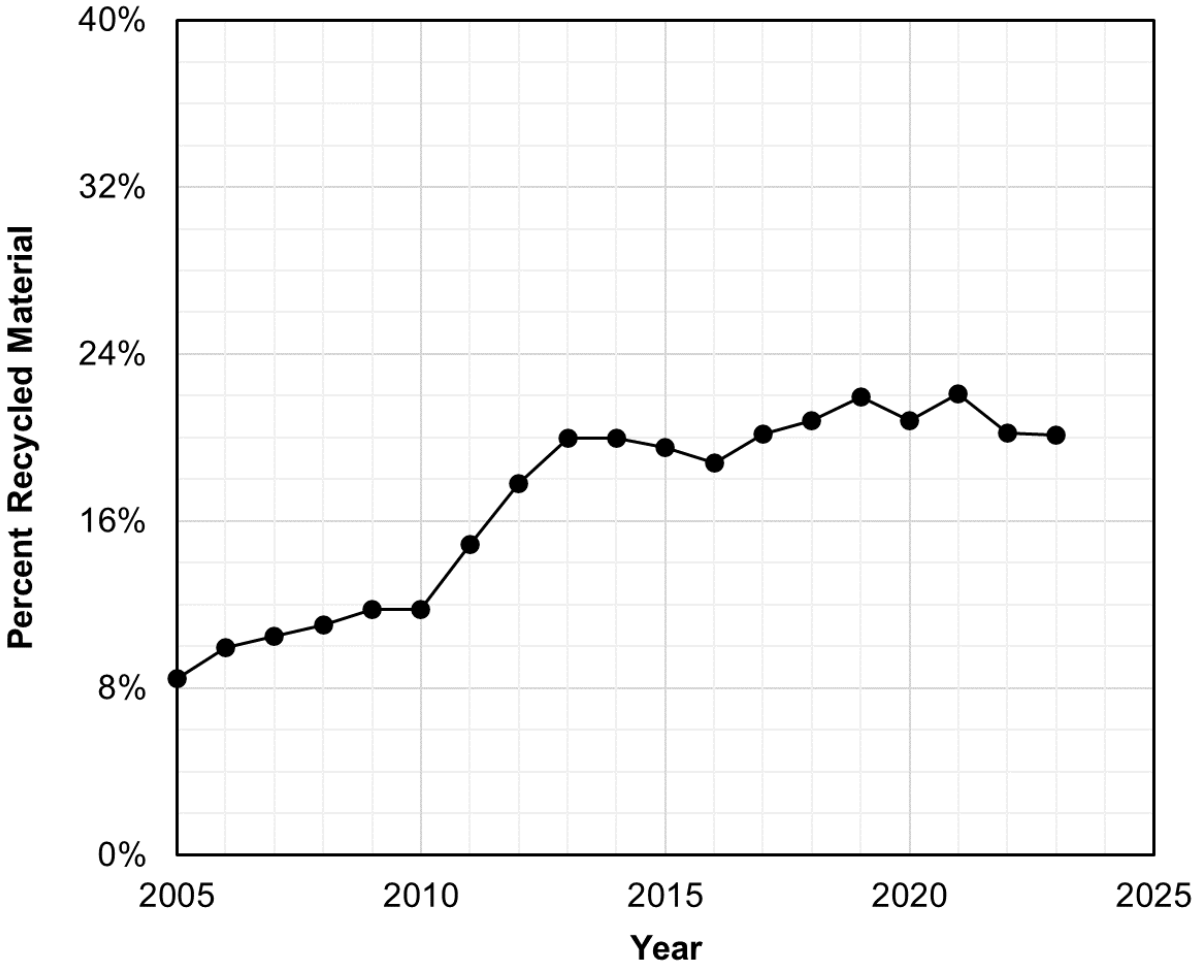
Material Use

Asphalt Binder



Combined Recycled Asphalt (%)

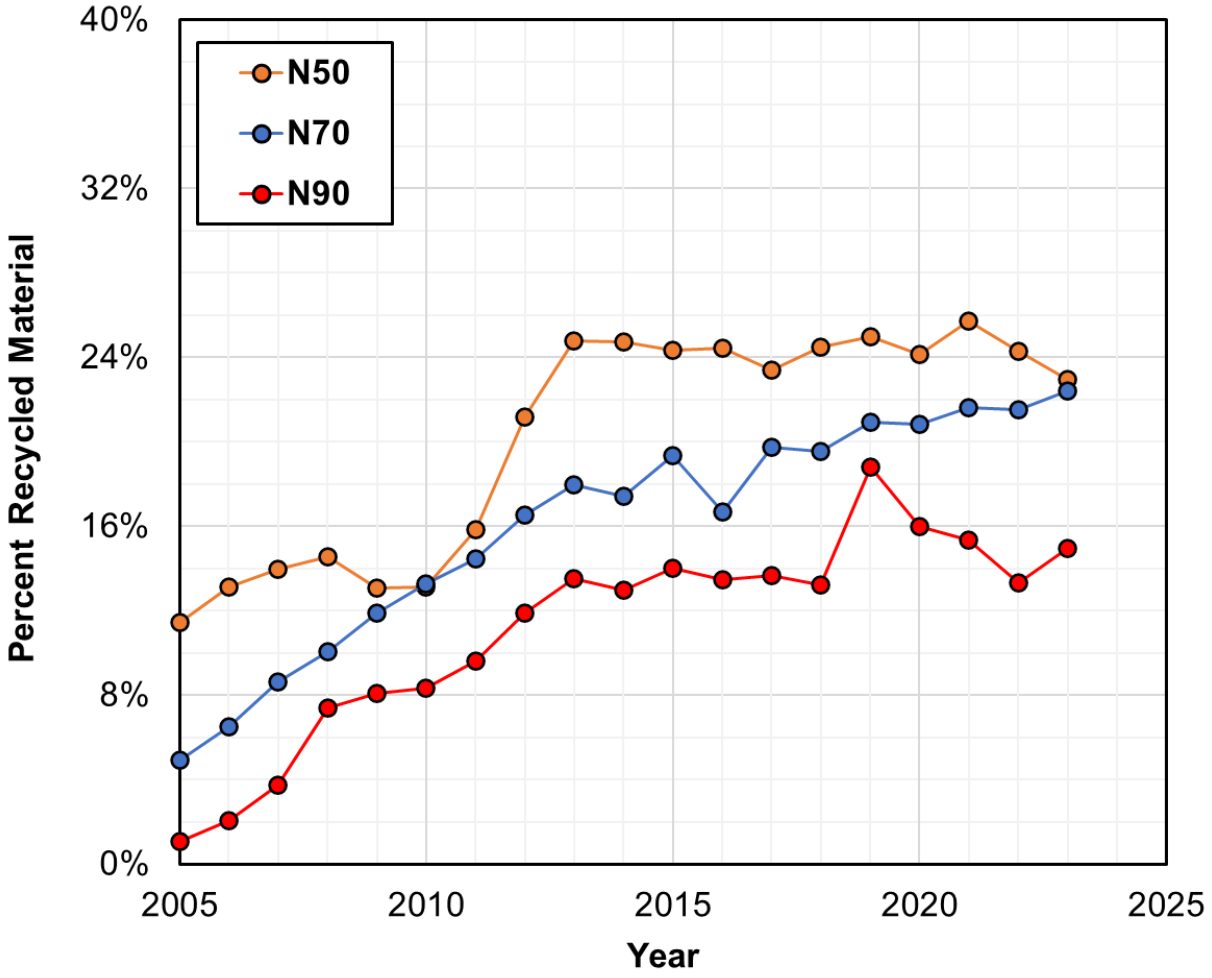
Average



Illinois Department of Transportation

Combined Recycled Asphalt (%)

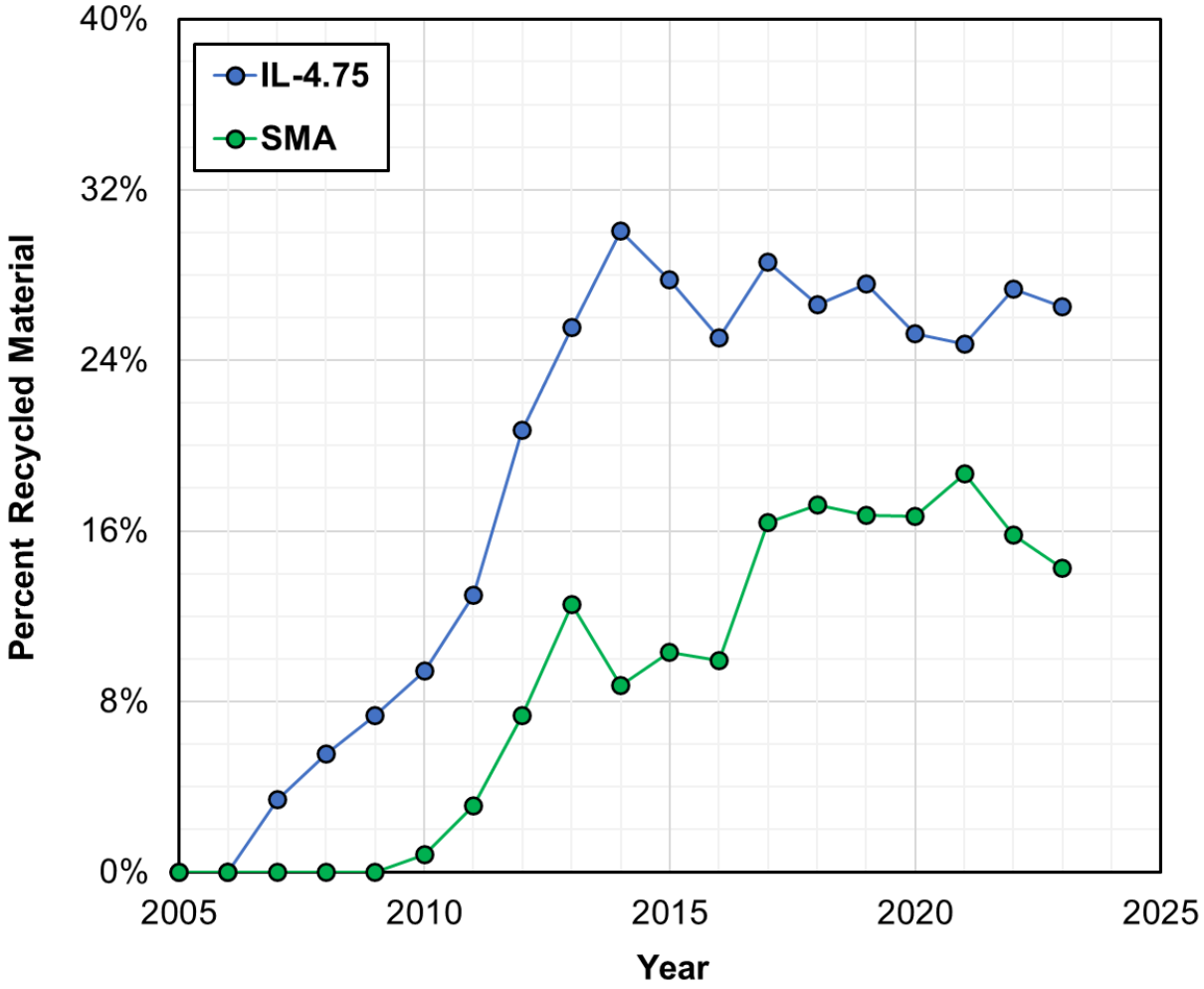
N50/N70/N90 Mixtures



Illinois Department of Transportation

Combined Recycled Asphalt (%)

SMA & IL-4.75 Mixtures



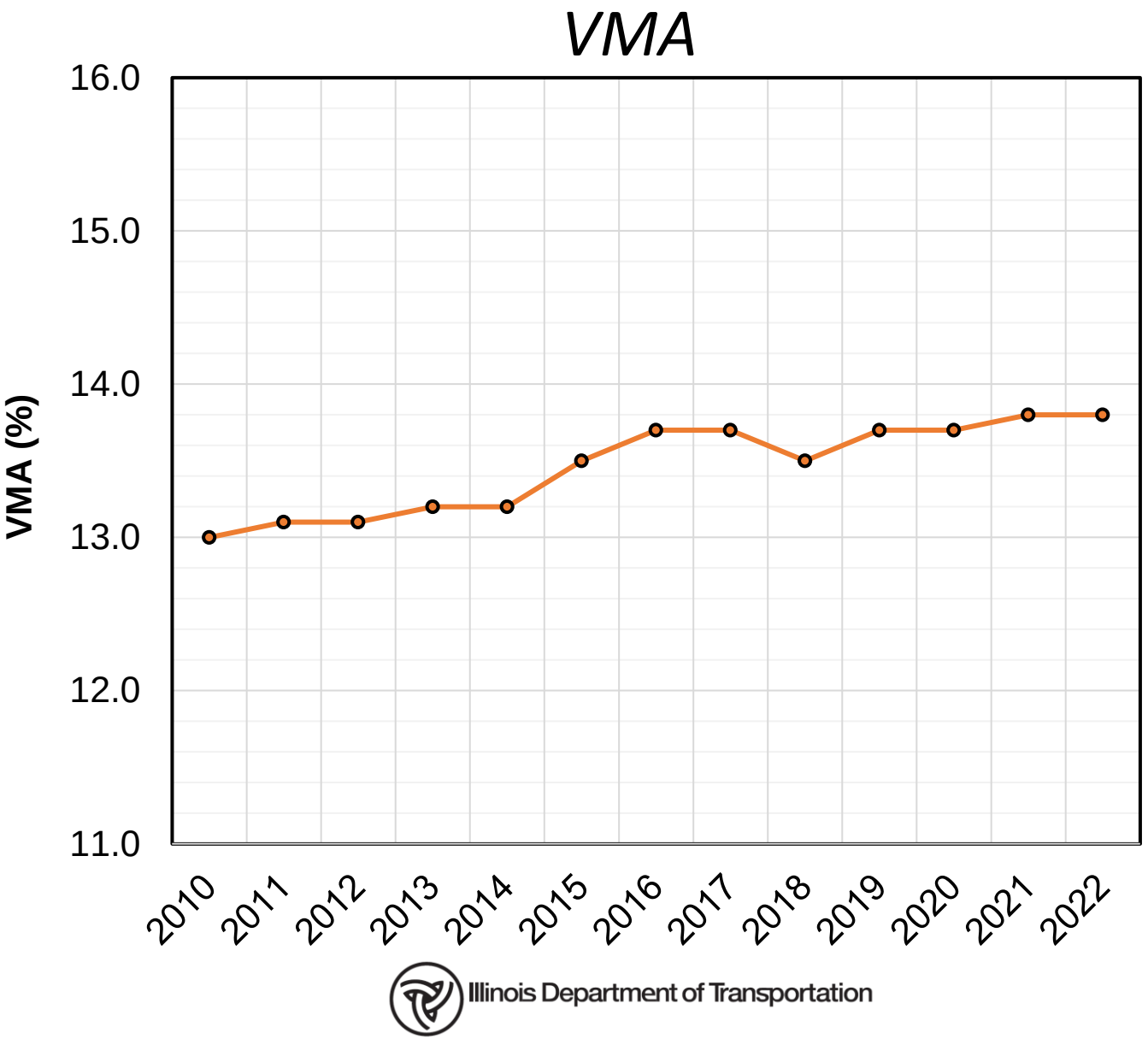
Illinois Department of Transportation

HMA Volumetrics Database Analysis

IDOT HMA Volumetrics Data Review

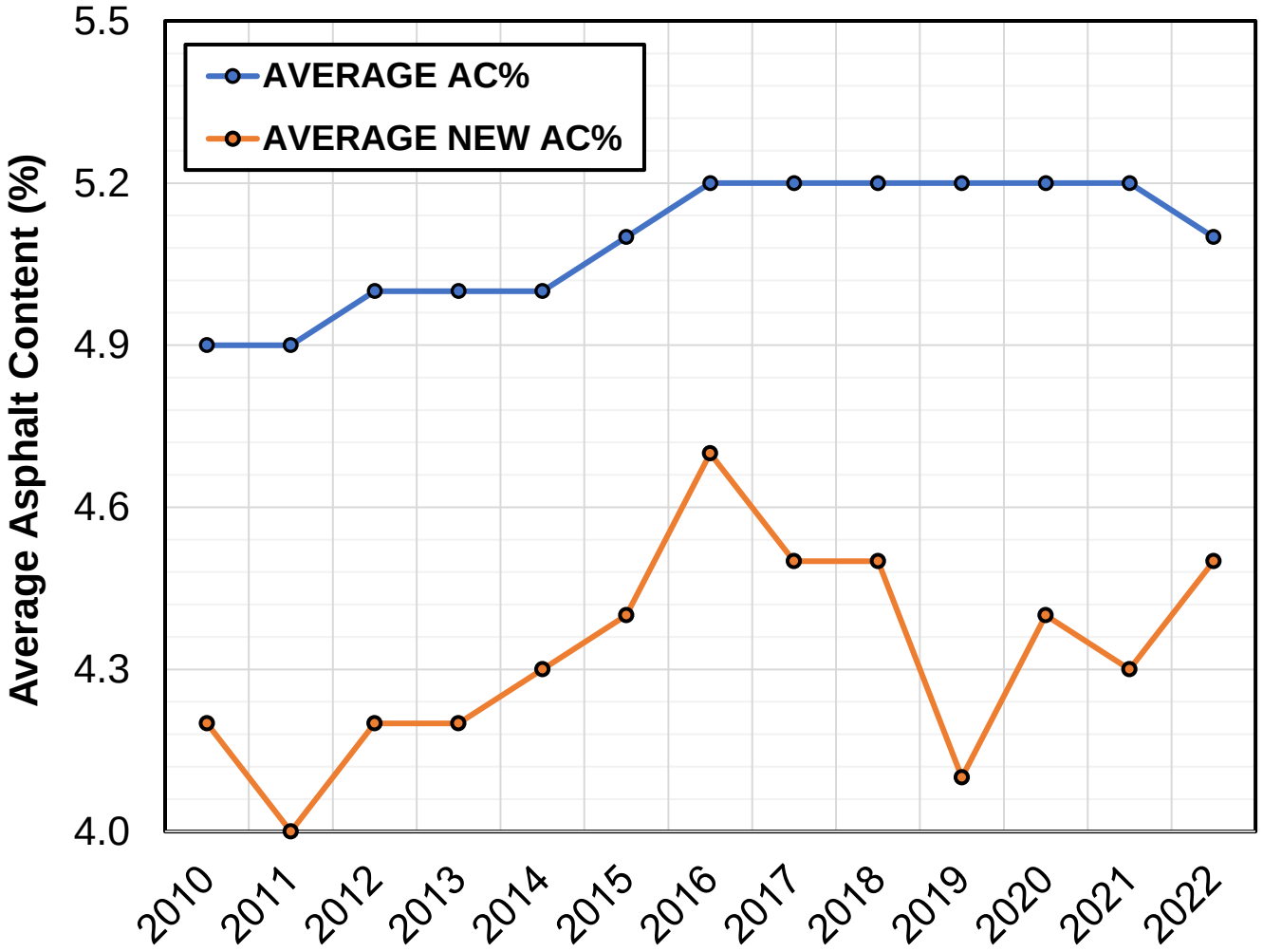
- Source
  - WebMISTIC
- Data Types
  - Department Test Results
- Years Reviewed
  - 2010-2022

IL-19.0 Binder Mixtures



IL-19.0 Binder Mixtures

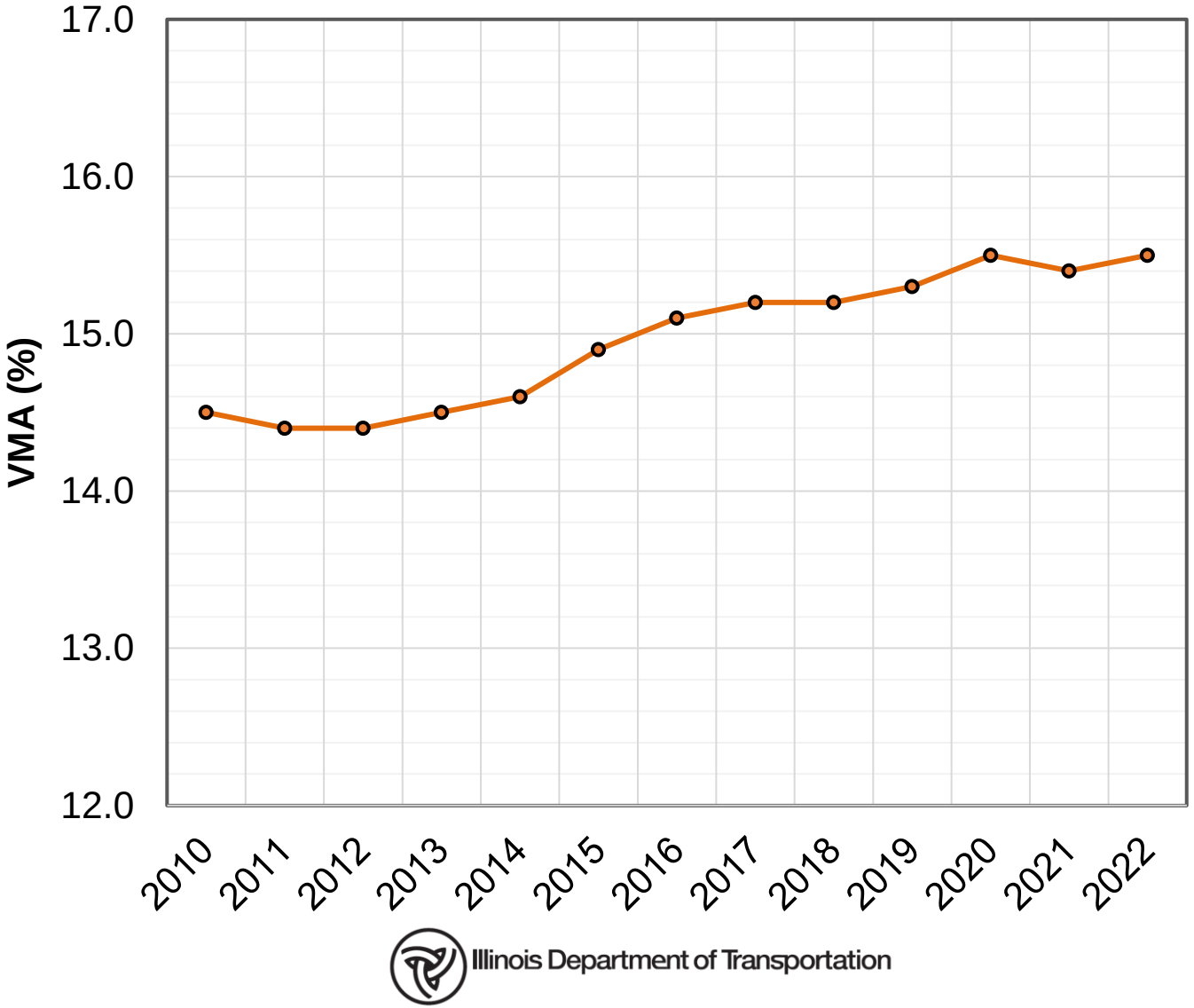
Asphalt Contents



Illinois Department of Transportation

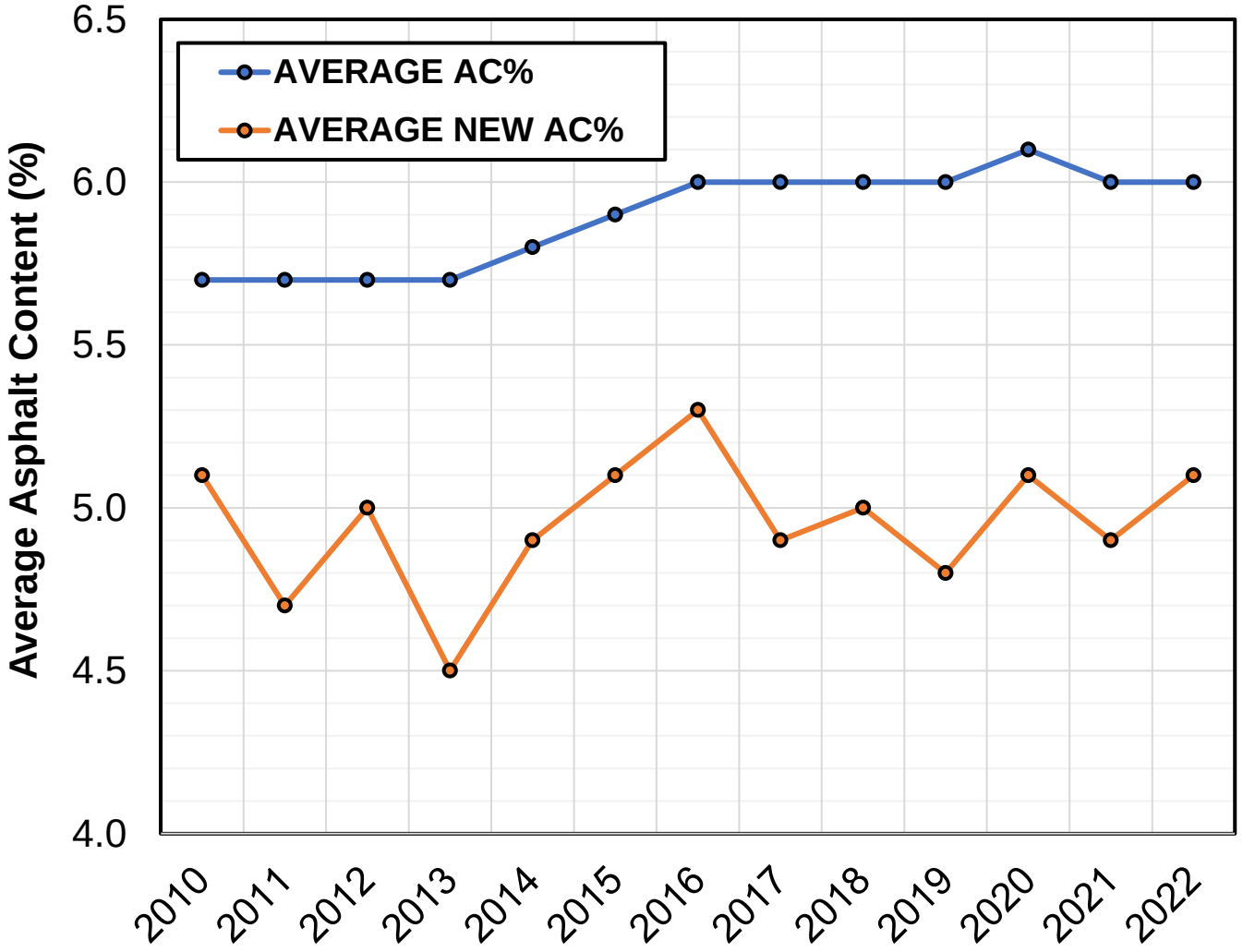
IL-9.5 Mixtures

VMA



IL-9.5 Mixtures

Asphalt Contents



HMA Density

Can IL HMA Density be Increased?

- Evaluate increased density potential by adjusting:
  - Density Upper Limits
  - N70's in lieu of N90's

Adjusting Density Upper Limits

- Move Upper Acceptable Limit to 98.5%
  - Recycled materials & Hamburg should reduce potential for instability at this density level

Acceptable Limits		
Parameter		Acceptable Range
Air Voids		2.0 – 6.0 %
Field VMA		-1.0 – +3.0 % 1/
Density	IL-19.0, IL-9.5, IL-9.5FG, IL-4.75	90.0 – 98.5% 2/
	SMA-12.5, SMA-9.5	92.0 – 98.5% 2/
Dust / AB Ratio		0.4 – 1.6 3/

Adjusting Density Upper Limits

- Binder Courses
  - No Upper Acceptable Limit if not trafficked before surface placement

Acceptable Limits		
Parameter		Acceptable Range
Air Voids		2.0 – 6.0 %
Field VMA		-1.0 – +3.0 % 1/
Density	IL-19.0, IL-9.5, IL-9.5FG, IL-4.75	90.0 – 98.5% 2/
	SMA-12.5, SMA-9.5	92.0 – 98.5% 2/
Dust / AB Ratio		0.4 – 1.6 3/

1/ Based on minimum required field VMA as stated in the mix design volumetric requirements herein.

2/ Upper limit is waived for HMA binder mixtures that are not open to traffic prior to placement of the HMA surface mixture.

3/ Does not apply to SMA.

Adjusting Density Upper Limits

- PFP PWL Calculation
  - Removed upper limit (98.5% max still in place)

Pay Parameters, Parameter Weights "f" and Quality Levels				
Pay Parameter		Parameter Weight *"f"*	*UL*	*LL*
Air Voids		0.3	Design Voids + 1.35	Design Voids – 1.35
Field VMA		0.3	MDR [/1] + 3.0	MDR [/1] – 0.7
In-Place Density	IL-4.75	0.4	None	92.5
	IL-9.5, IL-9.5FG		None	91.5
	IL-19.0		None	92.2
	SMA		None	93.0

Adjusting Density Upper Limits

- QCP Density Ranges
  - Adjusted upper limit for 105% step & others

Pay Parameter		Pay Factor			
		105%	100%	95%	90%
Air Voids [1/2/3/]		± 0.5%	± 1.2%	± 1.6%	± 2.0%
Field VMA [1/2/]		0% to +1.0% above minimum specified	-0.5% to +2.0%	-0.7% to +2.5%	-1.0% to +3.0%
In-Place Density [4/]	SMA	94.0% to **98.5%**	93.5% to **93.9%**	92.5% to **93.4%**	92.0% to **92.4%**
	HMA	93.5% to **98.5%**	92.5% to **93.4%**	91.5% to **92.4%**	90.0% to **91.4%**

N70's in lieu of N90's

- Place N90 fine aggregate requirements on N70 mixtures

Experimental Features

- Adjusting Density Upper Limits – 2 Projects Per District

- N70's in lieu of N90's (Surface Only) – 1 Project Per District
  - Minimum total tonnage - 1,200 tons for experimental N70 & 1,200 tons for control N90

HMA Storage Policy Memo

Storage Policy Memo Updates

- Procedure
  - Refers to new Manual of Test Procedures Evaluation Process
- Approval Process
  - Evaluate I-FIT short-term aging data per Storage Silo Make & Model at a Plant
    - IL-9.5 or IL-9.5FG non-polymer surface mixture sampled after 20 hours of silo storage
  - If approved, CBM will send letter to Contractor with a copy to District

QC/QA QC Air Voids Target

Proposed Update to Art. 1030.09(c) Table

CONTROL LIMITS						
Parameter	IL-19.0, IL-9.5, IL-9.5FG, IL-19.0L, IL-9.5L		SMA-12.5, SMA-9.5		IL-4.75	
	Individual Test	Moving Avg. of 4	Individual Test	Moving Avg. of 4	Individual Test	Moving Avg. of 4
% Passing: 1/						
1/2 in. (12.5 mm)	± 6 %	± 4 %	± 6 %	± 4 %		
3/8 in. (9.5mm)			± 4 %	± 3 %		
# 4 (4.75 mm)	± 5 %	± 4 %	± 5 %	± 4 %		
# 8 (2.36 mm)	± 5 %	± 3 %	± 4 %	± 2 %		
# 16 (1.18 mm)			± 4 %	± 2 %	± 4 %	± 3 %
# 30 (600 µm)	± 4 %	± 2.5 %	± 4 %	± 2.5 %		
Total Dust Content # 200 (75 µm)	± 1.5 %	± 1.0 %			± 1.5 %	± 1.0 %
Asphalt Binder Content	± 0.3 %	± 0.2 %	± 0.2 %	± 0.1 %	± 0.3 %	± 0.2 %
Air Voids 2/	± 1.2 %	± 1.0 %	± 1.2 %	± 1.0 %	± 1.2 %	± 1.0 %
Field VMA 3/	-0.7 %	-0.5 %	-0.7 %	-0.5 %	-0.7 %	-0.5 %

1/ Based on washed ignition oven or solvent extraction gradation.

2/ The air voids target shall be a value equal to or between 3.2 % and 4.8 %.

3/ Allowable limit below minimum design VMA requirement.

Manual of Test Procedures Updates

IL Mod AASHTO R 30

- Changes to the Standard:
  - R 30 was split into short-term aging (R 30) and long-term aging (R 121)
  - Oven temperature range reduced
    - From “up to 175°C ± 3°C” to “116-135°C ± 3°C” (241-275 °F)
- IL Modifications:
  - Removing R 121
  - LTA for I-FIT moved back to T 393 Appendix X2
  - Will revert to previous oven requirements
- No procedural changes for R 30 or I-FIT LTA

IL Mod AASHTO T 30

- Changes to the Standard:
  - Formatting changes
    - Added a section heading summarizing the method
    - Accidentally deleted a section heading
- IL Modifications:
  - Due to the heading typo, we will continue to use T30-21
    - With a reference to IL mod. R 35

IL Mod AASHTO T 164 & T 308

- Changes to the Standards:
  - Both added a note on reported decimal places
- IL Modifications:
  - Replaced note with:

"Rounding of asphalt content shall be completed according to Manual of Test Procedures Appendix B.28."

IL Mod AASHTO T 166

- Changes to the Standard:
  - Several formatting changes
    - Added 4 new sections, removed 4 notes
  - Requires use of “potable water”
    - Water that is suitable for drinking
- IL Modifications:
  - Renumbered most modifications

Appendix B.9 – Mix Design

- Updated Performance Testing Table

	TSR	Hamburg Wheel / I-FIT[1/]
IL Modified AASHTO Procedure	T 283	T 324 / T 393
Height of Gyratory Cylinders	95mm (3.74 in.)	160mm (6.30 in.) [2/]
No. Gyratory Cylinders	6	4 [3/]

1/ I-FIT Long-Term Aging (LTA) is required for surface mixes

2/ If a contractor does not possess equipment capable of creating 160 mm (6.30) tall gyratory cylinders, twice the required number of 115 mm (4.53 in.) cylinders will be acceptable (a total of 8).

3/ This is the total number of gyratory cylinders required for both tests, and may be reduced by 1 for binder mixtures.

Appendix B.4 – Test Strips

- Updated Performance Testing Table & Increased Number of Hamburg Wheel/I-FIT Gyratory Cylinders

	TSR	Hamburg Wheel / I-FIT[1/]
IL Modified AASHTO Procedure	T 283	T 324 / T 393
Height of Gyratory Cylinders	95mm (3.74 in.)	160mm (6.30 in.) [2/]
No. Gyratory Cylinders	6	6 [3/]

1/ I-FIT Long-Term Aging (LTA) is required for surface mixes

2/ If a contractor does not possess equipment capable of creating 160 mm (6.30) tall gyratory cylinders, twice the required number of 115 mm (4.53 in.) cylinders will be acceptable (a total of 12).

3/ This is the total number of gyratory cylinders required for both tests, and may be reduced by 1 for binder mixtures.

IDOT Quality Management Training Program (QMTP) Recertification

QMTP Recertification

- Recertification Exam Updates
  - Reduced length
- Requirement References
  - Updated HMA BDE Special Provision
  - Updated in PPG Manual & other supporting documents
- Dual Quality Control (QC) Manager Roles
  - If one individual oversees QC at Aggregate & HMA Facilities, they need to be recertified for both Aggregate & HMA

QMTP Recertification Websites

- QMTP General Website
  - https://learn.lakelandcollege.edu/IDOT/index.jsp

- QMTP Recertification FAQ's Website
  - https://learn.lakelandcollege.edu/IDOT/faq-recertification.jsp

Thank You for Your Attention!